

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 25

NEW YORK, JANUARY 10, 1924

Number 2

IT IS with much regret that the publishers announce the resignation, as editor of *Coal Age*, of C. E. Leshner, who has so ably conducted the paper during the last three years. His loss will be keenly felt by *Coal Age* and by the industry, for Mr. Leshner, through his clear and forceful discussions, furnished a leadership much needed in these troublesome times in coal production. Mr. Leshner will become assistant to the president of the Pittsburgh Coal Co., the largest producer of bituminous coal in this country.

No changes will be made in the editorial staff. The present organization, trained and inspired by Mr. Leshner, is not only competent to "carry on" but realizes that the opportunity for service to the industry was never greater. *Coal Age* is in a particularly favorable position to help. It has a sympathetic attitude toward the problems of the industry; it commands the industry's respect and confidence. At the same time it is sufficiently detached to see the problems with an impartial eye and to bring to the industry the counsel that results from an appreciation of the industry's obligations to the public. Such a task is not always a pleasant one, but the good of the industry requires that *Coal Age* have its courage high and speak without fear.

R. Dawson Hall, who has been with *Coal Age* since its establishment and who has an intimate acquaintance with the personnel and problems of the coal mining industry, will be in editorial charge of the paper, effective Jan. 18.

Speaking for the editorial staff, the publishers have no hesitancy in assuring the coal industry a service worthy of the respect and confidence in which *Coal Age* is held—a respect and confidence which have been heightened during Mr. Leshner's editorship and which he leaves as a precious heritage and a continuing inspiration to those who succeed him.

THE PUBLISHERS.

FOR the confidence and understanding sympathy of the many friends and readers who have contributed so much to the success of *Coal Age* and to the pleasantness of my editorship in the past few years I am sincerely appreciative. There is a peculiar satisfaction attaching to such work as this that brings one into intimate relationship with the real forces within an industry as large and important as coal.

Coal Age is an institution in the coal industry; my coming and going are but incidents in its history. It has traditions of service and ideals of greater and greater helpfulness to its field. To have been associated with *Coal Age* has been an inspiration and an honor. When next week I relinquish the reins to my present associates and step out of the roll of observer into that, where inclination and opportunity have led me, of active participation in the coal industry, it will be with more than perfunctory regret.

For Mr. Hall, who succeeds me, and his associates I bespeak the good will and co-operation of the men in the industry that it has been my good fortune to enjoy. Their efforts through that inanimate yet living thing, the printed page, to point the way and indeed inspire the men of the coal industry to better methods, safer practices and a larger appreciation of public service cannot bear full fruit without active participation by those in the daily grind of production and distribution.

It is fitting also to record here that which may not be known and appreciated by all, that *Coal Age* is a free agent, its editorial policies untrammelled by special interests, unhampered by exigencies of business policy. *Coal Age* does not speak for the coal industry, but as one of the family it speaks to coal men. To such a journal, as one of the industry, I pledge my loyal support, urging on my new colleagues my belief that *Coal Age* will be valuable as a tool in their work in proportion as they help to make it so.

C. E. LESHER, Editor.

Who Will Urge a Secretary of Mines?

PERENNIALY there rises the question of a Department of Mines. Probably the first recorded effort in that direction was by the American Mining Congress nearly fifteen years ago, when the present Bureau of Mines was authorized and organized. There is argued in favor of a Cabinet portfolio for mining that mining and agriculture are the country's two largest basic industries, that the farmers have a Cabinet officer, and that therefore the miners should have one. Senator Oddie, of Nevada, is advancing the idea strongly this winter. He is chairman of the Senate Committee on Mines and Mining and has given life to that committee by having maneuvered the reference of coal bills to it.

We believe that mining is of sufficient importance to rank with agriculture and would much rather have a Department of Mines to look after coal than have a section in the Interstate Commerce Commission regulate the industry. The railroads rank as high in national importance as mining but they have no Cabinet representative.

We sympathize with the effort Senator Oddie is making. We wish it success. But we cannot refrain from

noting that departments with Cabinet officers at their head are not created unless a large and influential section of the public demands that sort of recognition. The farmers have their department because they have the influence—the votes, if you please—and demanded the service and the representation that flows from a Cabinet official. Labor also has such a department; likewise general industry. When the public wants to regulate an industry it does not demand of its chosen representatives at Washington that they create a department for that purpose, but rather a commission.

The public, and Congress, look on coal as an industry to be regulated. Not until they see coal as an industry to be helped—not until mining comes into higher esteem—can we hope for the happy fruition of Senator Oddie's plan.

Preparing an Alibi

ELLIS SEARLES, unofficial spokesman for John L. Lewis, is reported in the press to have said recently that "a large and powerful element among the coal operators is doing everything within its power to force a strike next April." Chief among those assailed by

Mr. Searles as seeking to tie up the union mines are the "non-union operators of West Virginia, Kentucky, Maryland and southern Pennsylvania. If they can so manipulate matters as to cause a shutdown of the union mines north of the Ohio River, the non-union mines can then continue at work." He asserted that the United Mine Workers do not want a strike, but a continuity of employment.

That the union does not want a strike but plenty of work at the present scale we believe, if by union one means the controlling administration. But there is not plenty of work even at this time, there has not been plenty of work, and there is not going to be plenty of work for the union miners at the present scale. Sooner or later the non-union fields will cut into the union markets with lower costs. So it is obvious that the United Mine Workers cannot have what it desires—plenty of work at the present scale. What will be the second best desire of the United Mine Workers when the consciousness of this fact sinks deeply?

If Lewis elects to have a strike, on what grounds will he justify it? In 1922 he used the shibboleth of the "broken contract." Apparently this year he is laying the foundation well in advance, as he did two years ago, but this time he is preparing to put the blame on the non-union operator. If the outcome of the present uncertain situation is a strike—and why call it softly a suspension?—then, according to Mr. Lewis, it will be the non-union producer that brought it about. Just what this insidious individual has done, is doing, or is about to do, Mr. Searles has not said.

About all that the non-union operator can do is to compete with the union operator and annex all of his business that he can. It is of course a fine thing in a business way for the non-union fields to have the union so conduct itself as to make the organized fields a standby source of fuel for the nation, working when demand is good and shutting down when the market is stocked up. The non-union fields thus have the opportunity for more or less continuous operation, a position buttressed by their ability to adjust costs with fluctuations in the market.

But we think it most unfair for Mr. Lewis to prime Mr. Searles to go about telling the country that those awful non-union operators are planning to have a strike in the union fields, when the only people who can force a strike there are the union miners or the union operators. Are the union fields so weak that the *hope* that non-union producers are said to entertain that there will be a strike constitutes "a powerful influence working for a strike?"

The matter, after all, is clear enough. The United Mine Workers would like nothing better than a renewal of the present scale, and to get that will doubtless ask more in order to have a trading basis. The union operators would welcome a reduction in wages and therefore in costs so as to be able to meet non-union competition, but they have every reason to believe that they cannot accomplish that, even if they put the matter to the test of a prolonged strike. There is no suggestion, so far, of their asking for a reduction. Why, then, the early attempt to establish the alibi? Is President Lewis fearful that he cannot hold his men in line, that they will not be satisfied with a renewal and that there may be a strike despite his efforts to the contrary? Who in the coming summer can longer stand the gaff of short working time, the union miners or the union operators?

Small Cars, Low Tonnage

ONE cannot but feel in entire accord with many of John T. Ryan's reactions in regard to European conditions, as expressed in the article we publish this week. No one can fail to admire the conservational methods of Europe, the saving of coal, to say nothing of the low death rate per man employed if not per ton of product.

However, we cannot see how Europe is justified in its small mine cars. A redoubtable Belgian authority has assured us that the roadways in the mines of that country are large enough to permit of cars of large size and that larger equipment would be justified. That, however, we are informed, is not true of at least many mines in Great Britain.

Standardization is not so necessary in mining as in railroading. In the latter the equipment in many instances must be light enough to pass over the bridges of other railroads and small enough to clear the tunnels of other companies. But each mine is a unit in itself except in so far as it may be cheaper to buy equipment of the size that is being most generally manufactured.

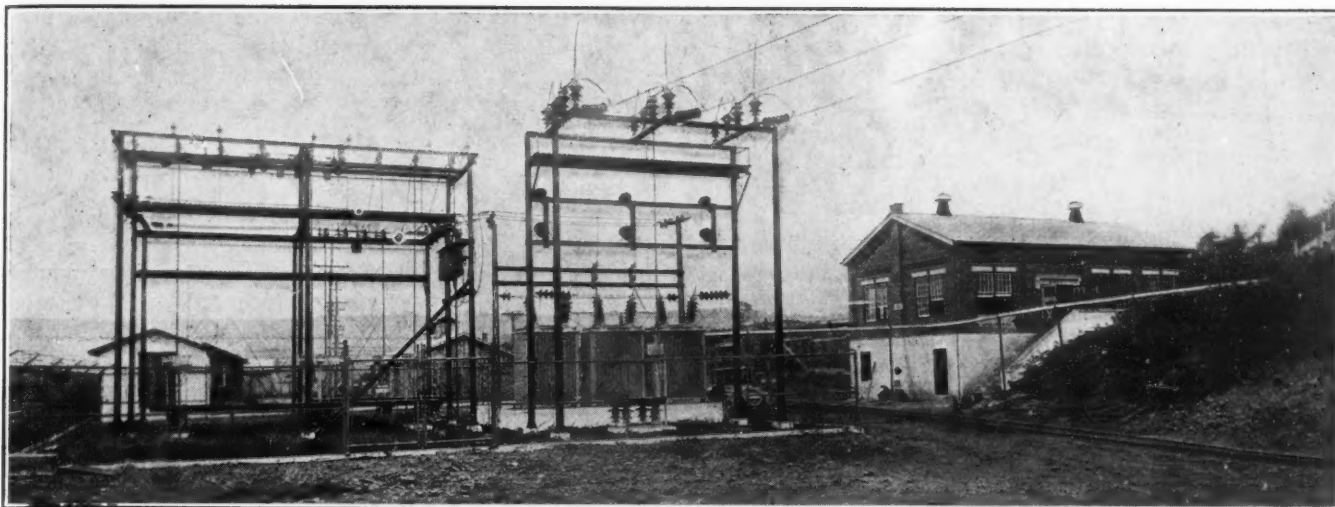
Consequently it would seem that at any mine a larger car might be used, provided that the work of enlarging the shaft and roadways would not be so costly as to make it impossible within a few years to recover the expenditure by savings in haulage, car handling and ventilation, keeping in view always the larger tonnages that bigger cars would make possible.

We are willing to accept the suggestion that in some British mines such alterations as would make the larger car possible would be, if not prohibitive, at least of problematic advantage, especially where the seams are thin and high headings would involve the handling of much rock. But this would not apply to new mines. Great Britain is not opening these as frequently as the United States—fortunately perhaps for that Kingdom—but nevertheless one would expect to see progress, for are not the mines in the deeper deposits in Yorkshire and all those in Kent relatively new? Here is a chance to show what large cars could do.

Great Britain is ahead of the United States in the use of face and roadway conveyors, partly because of the mining of thin seams. The coal, accordingly, frequently is brought to the main roadways by conveyors. On these roadways, therefore, surely big cars could be used. It seems likely that the United States will be induced to put larger cars than ever into its mines in order to keep the conveyors moving with less frequent delays as soon as such means of transportation are introduced. The use of conveyors, however, does not seem to have had any such effect on the methods of our British cousins.

Would that some Sir Isambard Brunel were alive today to urge on the British people the motto which Michael Angelo gave to Raphael in the latter's early years—"Amplius"—so that the British would in this matter seek larger standards of construction.

It will be remembered that Brunel was the man who gave the railroads of Great Britain, for a while, and in spots only, the six-foot gage. He was ahead of his time. Even the United States after trying it gave it up, but today many railroads would wish it had succeeded and the standard gage had failed. Fortunately in mining our car sizes are not standardized in the same way as in railroading.



Novel Application of Dynamic Braking On Large Slope Hoist

Peculiar Requirements of Hoisting and Lowering Speeds Under Widely Differing Loads While Handling Coal, Supplies and Men Necessitate Unusual Type of Control—
Success of Installation Proves Efficacy of Plan

BY R. W. MCNEILL
General Engineering Department
Westinghouse Electric & Manufacturing Co.

EVERY electric hoisting installation is a problem in itself and requires careful study for the best solution. The type of equipment which may be the best for one set of conditions may prove unsuited or uneconomical for a different set of conditions. To decide each problem on its merits is the engineer's problem. In most cases some particular feature of operation or of power supply will be the deciding factor in the choice of the type of equipment to be used. In the case of the hoist for the Packer No. 2 slope of the Lehigh Valley Coal Co., at Shenandoah, Pa., the requirements were such as to impose several unusual operating conditions and the equipment finally selected to meet these conditions makes use of many features not commonly used with electric mine hoists.

The Packer No. 2 slope is in what is known as the Mammoth Vein. The angle of inclination as compared to the horizontal is not uniform, varying between 36 and 45 deg. It is of the single-compartment type equipped with a single track on which cars are hoisted and lowered by a single-drum single-cable hoist to handle men and material. A cross-section of the mine slope is shown in Fig. 1. Material is handled two cars per trip, the maximum weight of the loaded trip being 31,000 lb. and the weight of an empty trip being 9,600 lb. Men also are hoisted in two cars per trip, ten men in each car. Coal, rock and empty cars are handled at a speed of approximately 1,200 ft. per minute while men are handled at approximately 500 ft. per minute. All coal and rock, whether mined above or below the second level, is landed on this level and taken out of

the mine through a tunnel which intersects the slope at this point. Men are handled from the surface to the different levels and are brought to the surface on completion of the shift.

From the foregoing it is readily seen that the operating conditions are quite different from the usual mine hoist in that operation is "unbalanced" at all times and that widely varying loads must be handled in the two directions of travel. To these conditions there was added the stipulation that the operating speed should at all times be completely under the control of the operator with a minimum use of mechanical braking.

Selection of the mechanical parts of the hoist was a fairly simple problem, for the mechanical construction of the hoist was fairly well fixed by the operating conditions as a single-drum geared machine with mechanical brakes of sufficient capacity to hold the load safely in case of power failure, and to take care of a moderate amount of braking without overheating.

Selection of the proper electrical equipment for operation of the hoist was not so simple. Power for operation of the electrical equipment was available at 2,200 volts, 3 phase, 60 cycles, and while it would have been a comparatively simple matter to obtain the required operating characteristics by using a direct-current hoist motor and motor-generator set, using Ward-Leonard control, this would have necessitated a large motor-generator for supplying power to the hoist motor and the outfit would have had a rather high first cost and would have been uneconomical in the use of power.

It was thought best, therefore, to investigate to determine if the required characteristics could not be obtained with a wound rotor induction motor and special control equipment. Satisfactory operation in the hoisting direction did not present any particular prob-

Headpiece shows general view of hoist building. Purchased power is supplied at 66,000 volts and stepped down to 2,300 volts. Ample provision has been made for increasing the transformer capacity. On the extreme left is shown a distributing tower designed to supply other mines in this region also mined under lease from the Girard estate.

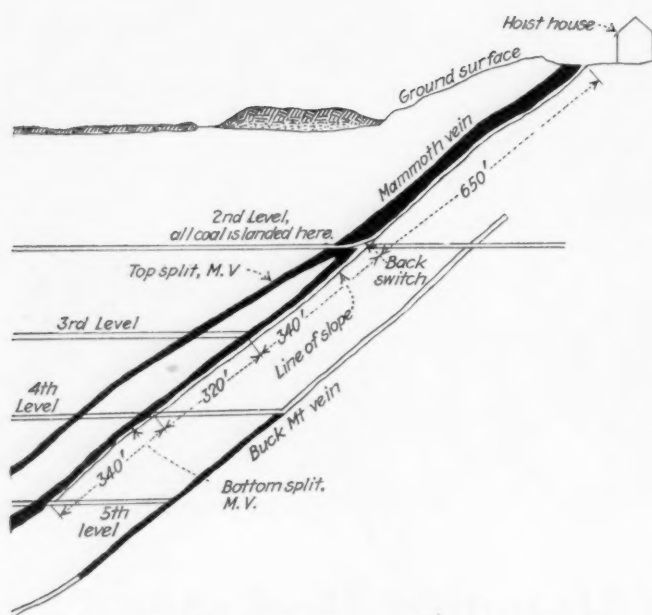


FIG. 1—SECTION THROUGH PACKER NO. 2 SLOPE

Coal hoisting is carried on from the third, fourth and fifth levels to the second level. Supplies and men are hoisted between the various levels and the surface. Occasionally heavily loaded rock cars are hoisted to the surface, thus placing a heavy load upon the hoist.

lem with an induction motor other than that the motor be of sufficient capacity to handle the heaviest loads at full speed, as the problem of obtaining reduced speeds with light loads was simply a question of external resistance and control points to give the required speeds at the different torques necessary.

To obtain satisfactory operating characteristics in the lowering direction was a more perplexing problem. There were available two ways of obtaining electrical braking and speed control with the overhauling loads encountered in lowering. The first and most obvious method was to lower against the torque of the motor, with power applied to the motor primary by the same switches as for the hoisting direction and regulated by the secondary resistance to keep the braking torque of the motor balanced against the overhauling torque produced by the descending load to obtain speed control.

The second method and the one finally adopted makes use of direct-current excitation on the stator of the induction motor to obtain dynamic braking. With this

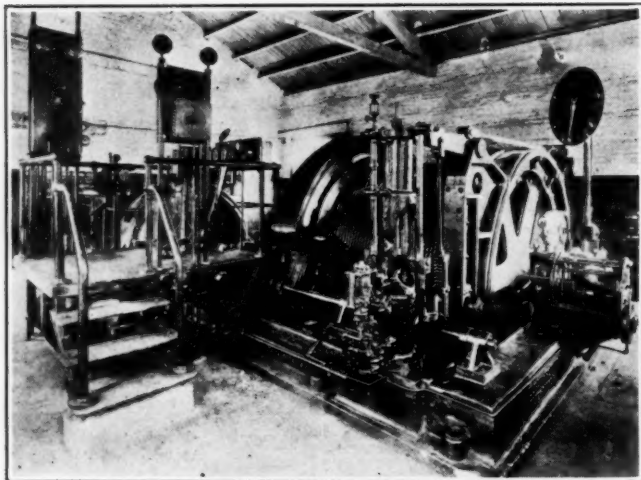


FIG. 2—GENERAL VIEW OF HOIST ROOM

The overspeed governor and limit switch are on the extreme right of the drum shaft. At overspeeds or overhoists in either direction this mechanism operates to stop the hoist automatically. A back-out switch permits the operator to operate the hoist again only in the safe direction after he has made an overhoist and been automatically stopped.

method, as the rotor is turned by the descending load, alternating-current power is generated by the rotor windings. When this power is absorbed in an external secondary resistance, true dynamic braking is obtained. Speed regulation is obtained by variation of the stator excitation and secondary resistance. This method of braking has not been used on mine-hoisting installations to any extent in the past, since on most installations the braking duty is not severe enough to warrant the extra complications and expense involved in the use of this system. Therefore the results which may be obtained by dynamic braking on induction motors are not generally so well understood as is the reverse torque method, which has been used with a great deal of success, particularly on small installations.

Final decision to install the dynamic braking control rather than the reverse torque control was made after a careful analysis of the two systems and was influenced largely by the material savings in power consumption and superior control obtainable with the dynamic braking system, for the difference in cost between the two was very slight.

Use of power while lowering with the dynamic braking system is limited to that necessary for the operation

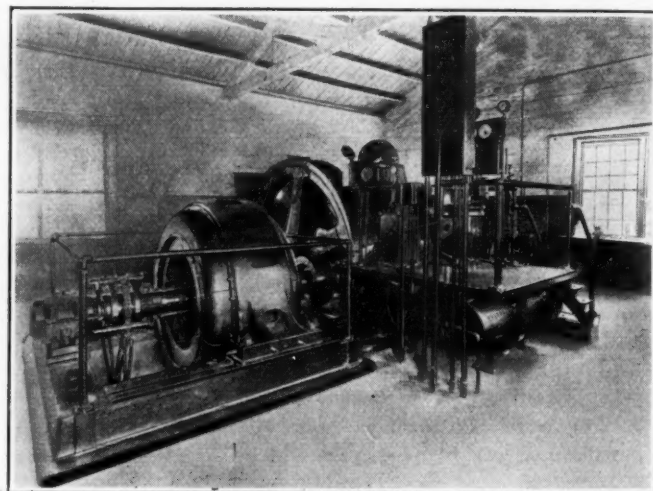


FIG. 3—700-HP. WOUND ROTOR INDUCTION TYPE HOIST MOTOR

To facilitate inspection, cleaning and repair the motor stator may be easily moved to the side. A large flexible coupling connects the motor to the hoist.

of a small exciter, while with the reverse torque method practically as much power is taken from the line in lowering a given load as would be required to hoist the same load and a much larger resistor is required than is the case with the dynamic braking control used because the resistor must not only absorb the power generated by the descending load but must also absorb nearly all of the power taken from the line.

Superior control is possible with the dynamic braking system because of the possibility of adjusting both the stator excitation and the secondary resistance, thus obtaining a wide range of torques and lowering speeds. To obtain the same nicety of operation by the reverse torque method would require a controller with a large number of points.

The equipment finally decided upon and installed at the Packer No. 2 slope consists of a 700-hp. 500-r.p.m. 2,200-volt 3-phase wound-rotor motor geared to a hoist having a cylindrical drum 8 ft. in diameter and 6 ft. wide. Figs. 2 and 3 show the general appearance of the combined hoist unit as installed. The motor is

of the underslung type of construction with low pedestal bearings and includes provision for accurate movement of the stator for adjusting the air gap as well as for sliding the stator off the rotor for the purpose of inspecting or repairing either rotor or stator windings.

The motor is mounted on a bedplate continuous with the hoist bedplate and is connected to the hoist gearing through a flexible coupling. The hoist is equipped with cut steel herringbone gears with an enclosing gear case, a drum brake of the post type, a pinion shaft brake of the band type, an overspeed governor, and a geared limit switch. The brakes are of the gravity-applied, air-released type, air being furnished by a small motor-driven compressor. Emergency operation of the brakes from overtravel, overspeed or failure of power is taken care of by a magnet release device, failure of current on this device causing application of the brakes.

The control equipment consists of a primary circuit-breaker panel, air-break primary reversing contactors, excitation contactor, air-break secondary contactors, grid resistors, master controller, control circuit transformers, and exciter motor-generator set with its control equipment. The scheme of electrical connections and the sequence diagram are shown in Figs. 4 and 5. The appearance of the control equipment as installed is shown in Figs. 6 and 7.

The exciter motor-generator set consists of an 18-kw. 60-volt d.c. generator direct-connected to a 25-hp. a.c. motor, and operates at 1,800 r.p.m. The motor-generator set is operated from the same transformers used to supply current for the operating magnets of the contactors on the control panels. All contactors are magnetically operated with alternating current; no dynamic braking is obtained in case of power failure.

Several interesting problems arose in laying out the control equipment, particularly in regard to convenience of operation, reliability and safety. As finally designed

all operations are logical ones and do not call for unusual concentration on the part of the operator. Movement of the master controller from the "off" position, either hoisting or lowering, tends to give an increase of speed, while slow-down is obtained by an opposite movement. This is accomplished by a different sequence

of operation of the secondary contactors for the two cases.

A study of the curves, Fig. 8, shows that the lowest speeds with dynamic braking are obtained with the lowest resistance, while the reverse is true in hoisting. The design of the secondary resistance, particularly as regards the resistance values at the different control points, had to be a compromise between what would give best results for power and braking operations. Some of the points absolutely necessary for power operation were useless as braking points, and similarly it was necessary to provide braking points not needed for power points.

Reference to Figs. 4 and 5 will show that only four of the secondary contactors used for power operation are used in braking, while one secondary contactor used in braking is not used for power operation at all. Additional contactors for braking operation would have been necessary if advantage had not been taken of variation of the stator excitation to give additional control points. Separate current-limit relays were added

to the control equipment to take care of deceleration on the dynamic-braking connection, as it was desirable to use a different current setting for braking than was desirable for hoisting.

The relays on the braking connections serve a somewhat different purpose than those on the power connections in that their purpose is not to limit the decel-

		Sequence of Operation of Contactors																	
		From Master Controller									From Control Points, "Lower"								
Cont.	Control Point	Hoist	Off	Control Point	Lower	Control Point	Lower	Control Point	Lower	Control Point	Lower	Control Point	Lower	Control Point	Lower	Control Point	Lower	Control Point	Lower
1	9	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	9	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			

FIG. 5—SEQUENCE TABLE SHOWING WHEN EACH CONTACTOR FUNCTIONS

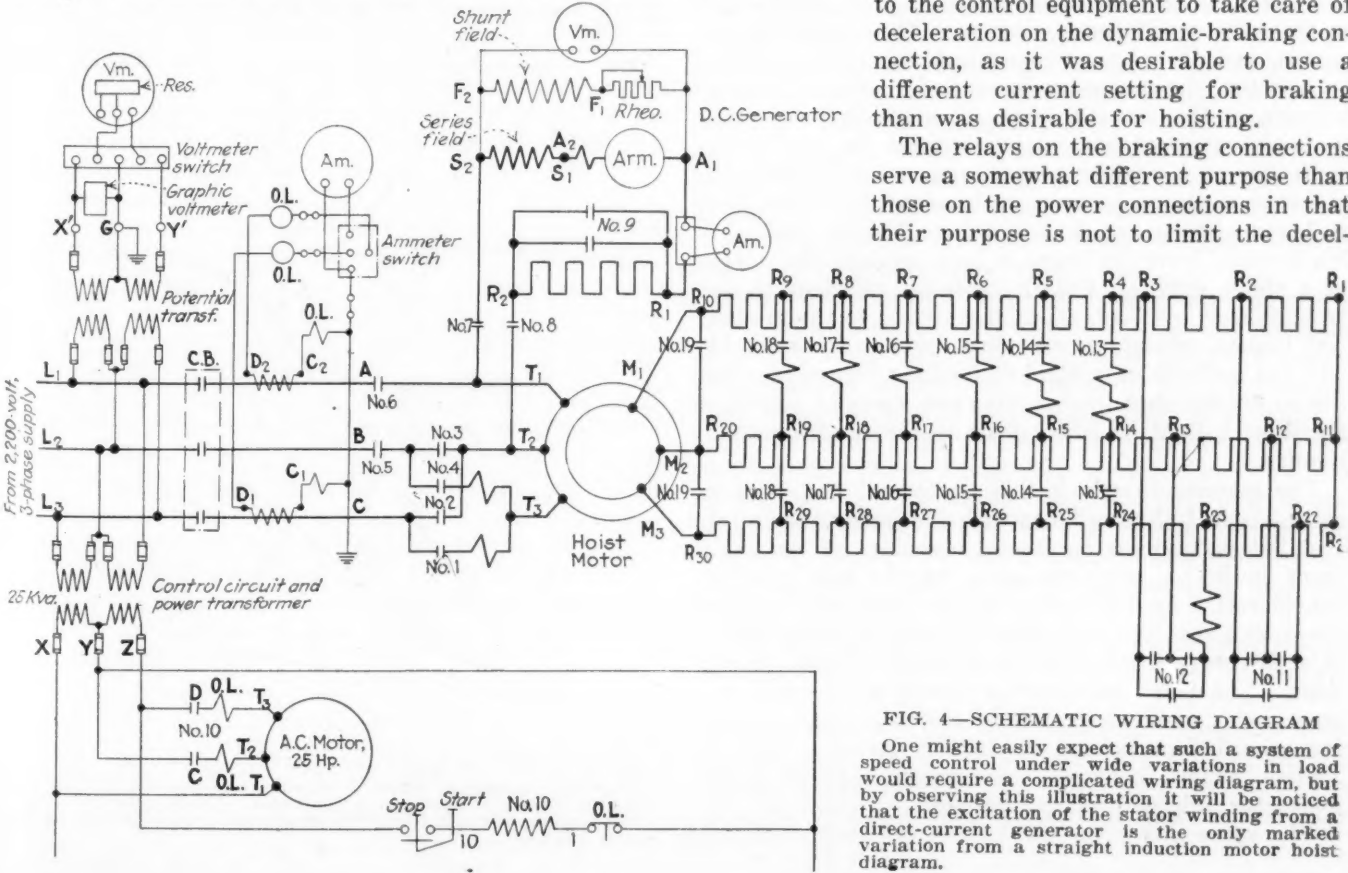


FIG. 4—SCHEMATIC WIRING DIAGRAM

One might easily expect that such a system of speed control under wide variations in load would require a complicated wiring diagram, but by observing this illustration it will be noticed that the excitation of the stator winding from a direct-current generator is the only marked variation from a straight induction motor hoist diagram.

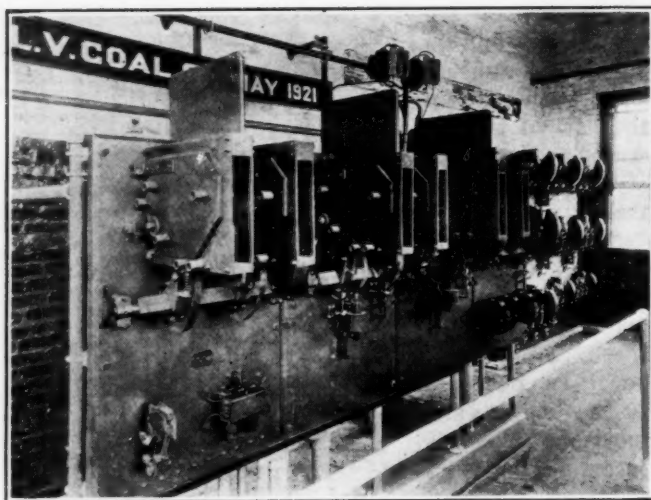


FIG. 6—PRIMARY AND SECONDARY CONTACTORS

All the circuits are made and broken by means of heavy air-break contactors. The contactors in the foreground are the primary reversing switches.

erating torque in any way, but rather to obtain such operation of the control equipment as to insure against loss of braking torque resulting through cutting out resistance too rapidly. Primary reversing contactors and power points in the lowering direction were incorporated into the controller to take care of the necessity of turning the hoist drum over for "slacking" cable. One point was added to the master controller for this purpose, this point being connected in series with a foot-operated switch so that, to get power in "lowering," the master controller must be left on this point and the foot switch operated. In normal operation this point on the master controller is passed over without any operation of the contactor panels.

The fact that this hoist has been giving unusually satisfactory service since it was put into operation, over two years ago, is the best evidence of good engineering in the selection of the equipment. The operations are simple, and do not tend to confuse the hoist operator. In hoisting, the controller is handled in much the same manner as the throttle lever on a steam hoist while in lowering speed control is obtained by the master controller in a manner very similar to that which the operator would use if he were handling his brake lever to lower against the friction of mechanical brakes, or his reverse lever to lower a load against the torque of a steam engine. Braking torques sufficient to control the heaviest loads without recourse to the mechanical brakes, except at very low speeds, are available, and the methods of control of braking torque provided are so flexible that the operator can lower at maximum speed with light or heavy load as the conditions may require.

The manner in which this equipment has been installed is in full accordance with the importance of the installation, and the successful operation of the equipment is in no small measure due to the care and consideration used in laying out the hoist and installing the equipment. The hoist house, shown in the headpiece, is a two-story brick building with two rooms on each floor. The hoist and driving motor are housed in a large room on the second floor while the small room on the second floor houses the circuit breaker, magnetic control panels, control transformers, exciter motor-generator set, and air compressor.

The space under the hoist room is pretty well filled

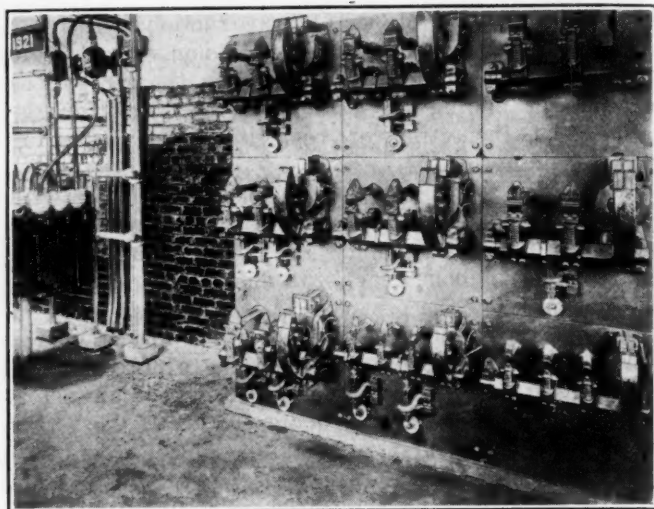


FIG. 7—SECONDARY CONTACTOR PANEL

These switches control the hoisting speed and also assist in controlling the dynamic braking. On the left is the main-line oil switch supplying 2,300 volts to this hoist.

with foundations, but affords room for a small workshop and place for the storage of materials. The grid resistors are housed in a room directly under the contactor panels, thus affording short connections between the secondary contactors and the resistors. Ample ventilation is provided for the resistors by openings in the walls and a ventilating fan and chimney.

The arrangement of the apparatus on the operating platform of the hoist has been given a great deal of consideration and care. Control and brake operating mechanisms are within easy reach of the operator, as also are the operating panel for the main circuit breaker and the panel for the exciter. Closing of the main breaker puts the whole equipment in readiness for service since the air compressor and exciter motor-generator set are provided with automatic starters. Operation of the air-compressor unit is governed by the

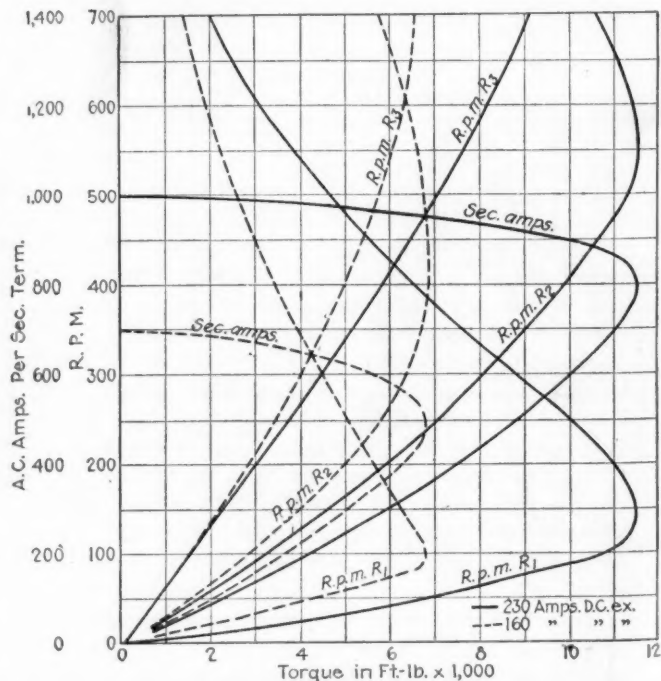


FIG. 8—DYNAMIC BRAKING CURVES

Showing the widely different lowering speeds obtainable on different positions of the master controller. Notice how the speed-torque curves depend upon the direct current excitation of the stator winding.

air pressure. Air gages show operation of the air-braking system while electrical meters do the same for the electrical equipment.

The system used on this installation is well adapted for any type of unbalanced hoist where positive speed control is desired in both directions of operation, and where in normal operation power will only be required in one direction. Effective braking by electrical means is obtained down to very low speeds, reducing mechanical braking to a minimum. The system is not so well adapted to balanced hoists where occasional braking is desired, due to the fact that at times braking may be required in either direction, while at other times power may be required in either direction. However, this condition could be taken care of by the use of a separate reversing controller mechanically or electrically interlocked with the main master controller.

Advantages of Byproduct Coke For Domestic Heating

**Eliminates Smoke, Reduces Need to Clean
Furnace and Flues, Requires Less Attention
Than Coal and Gives Even Temperature**

By A. R. POWELL*

The Koppers Company, Pittsburgh, Pa.

DURING the last decade the use of byproduct coke for domestic heating purposes has grown by leaps and bounds until at the present time it must be considered one of our staple fuels. The substitution of byproduct coke for raw coal has decreased the smoke nuisance in many of our cities, and it is not impossible to foresee a time when coke will entirely replace bituminous coal, in which event our smoke problem, with its consequent tax on the health and pocketbooks of city dwellers, will be a thing of the past.

In spite of the convincing evidence of the superiority of byproduct coke as compared to the majority of other fuels used for domestic heating, some misunderstanding regarding it still seems to exist. A statement has recently been made which might give the impression that "hard metallurgical coke" has not given satisfactory results when used as a domestic fuel. Without attempting to controvert the possible usefulness of any other type of fuel for domestic heating, we must not lose sight of the fact that coke of the "hard metallurgical" type is giving satisfactory service to thousands of domestic consumers and that the sale of coke for domestic purposes is increasing enormously.

For many years the U. S. Bureau of Mines has conducted experiments on the burning of coke and other fuels in house-heating furnaces. The following quotation is taken from Technical Paper 242, by Henry Kreisinger and A. C. Fieldner:

"Coke should be used for heating houses because it is a clean and convenient fuel. It eliminates smoke, reduces the necessity of cleaning the furnace and flues, requires less attention than coal, and gives a more uniform temperature in the house."

I have first-hand knowledge that at least some of the men who have had charge of fuel investigations for the Bureau of Mines now use byproduct coke of the "hard metallurgical" variety for the heating of their own

homes and these men assert that they will never return to any other fuel now used. If these investigators of many years' experience practice and preach the doctrine of byproduct coke, with no "axe to grind" in so doing, can we conclude that byproduct coke is unsatisfactory as a domestic fuel? The answer is obvious.

And if unprejudiced fuel experts prefer byproduct coke in their own homes, should not the average householder use that fuel also? Perhaps it requires an expert to operate on byproduct coke, and the average citizen would be unable for this reason to enjoy the benefits accruing from its use. The answer is found in a letter written by O. H. Prestemon, a citizen of Minneapolis, where the winters are long and cold and where the fuel problem is of vital importance to all householders. The following is quoted from this letter:

"The proof of the pudding is in the eating." I have kept an accurate account of the monthly fuel consumption required to comfortably heat my seven-room home for three years. . . . My fuel bill is 15½ per cent less than when I used coal, in spite of increased prices. This is more convincing to me than laboratory tests.

"Besides lower cost, other advantages equally important are:

"Cleanliness.—The furnace is clean and free from soot, thereby increasing its heat radiating efficiency. The furnace room is clean and consequently you are not carrying coal dust on your shoes all over the house. From the point of view of the lady of the house this is important.

"Reduced Labor.—It cuts the trips to the furnace room to about two per day.

"Uniformity of Quality.—When you buy [byproduct] coke you know exactly what you are getting.

"Evenness of Heat.—The heat is steady and even, but easily regulated.

"Low Ash Content.—Perfect combustion reduces the ash nuisance to a minimum."

The experience of this householder must be multiplied many thousands of times to gain a true idea of the enormous quantities of byproduct coke now being successfully used for domestic heating. After all, this is the criterion by which the usefulness of any marketable article must be judged, and in view of the fact that byproduct coke of the "hard metallurgical" type has many thousands of enthusiastic users, we must conclude that it is a satisfactory domestic fuel.

Some consumers of byproduct coke have gained a misconception of its usefulness by improper methods of firing. Coke occupies more volume per given weight than coal and the fuel bed necessarily must be thicker. Also when the fire is once started very little draft is required in the case of coke. If these two rules are followed the fire will maintain a steady rate of heat generation for long periods of time. Clinkering results from the fuel bed getting too hot and any troubles of that kind when coke is used are due to leaving the draft open too wide, thereby getting an intensely hot fuel bed.

The burning out and bending of grate bars will be caused if ashes are allowed to accumulate in the pit, and this is true of coal as much as it is of coke. In fact, any fuel will give bad results if improperly fired. In the early days of anthracite a prejudice existed against its use because it "didn't burn easily." The rules for firing coke are just as simple as those for

*Industrial Fellow, Mellon Institute of Industrial Research.

firing coal; but they are somewhat different, and neglect to observe these will result in failure, as will be the case with any fuel if not properly fired.

In some ways it seems useless and foolish to justify the usefulness and practicability of a domestic fuel which has so thoroughly justified itself in many thousands of homes, and which, when subjected to scientifically conducted heating tests, has shown the highest furnace efficiency of any solid fuel on the market. Since some misunderstanding seems to exist, however, and since this may create a false impression, it is well to emphasize the well established position of byproduct coke as an ideal domestic fuel.

The following excerpts from Technical Paper 315 of the U. S. Bureau of Mines on "Comparative Tests of Byproduct Coke and Other Fuels for House-Heating Boilers," give some interesting data to the coke user:

"The first series of tests, 27 in all, was made in the fuels laboratory of the Pittsburgh experiment station with small steam boilers suitable for heating a seven or eight-room house. The fuels were byproduct coke, anthracite, and Pittsburgh coal. The second series, 17 tests, was made in the fuels laboratory—built for these tests—at the Minneapolis station of the Bureau of Mines, with a small steam boiler of similar size to that used in the tests at Pittsburgh, and with another larger boiler of the type used in heating small apartment-houses. The fuels used were byproduct coke, anthracite and Illinois coal.

"As far as possible, the boiler was operated as it would be in actually heating a house. A test usually lasted from Monday morning until Friday or Saturday morning; and at night the fuel was burned at lower rates than in the day time. A more detailed description of the method of operation will be found under 'Method of Conducting Tests.'

"A brief summary of the results is given in Table I, which shows that the efficiency was as high with byproduct coke as with anthracite. In fact, the two Capitol boilers gave somewhat higher efficiencies with coke than with anthracite. The efficiencies obtained with Pittsburgh and Illinois coal were 8 to 20 per cent lower than that obtained with byproduct coke.

"The relative quantities of bituminous coal, coke, and anthracite needed to maintain a house at a comfortable temperature during the winter depend upon the calorific values of the fuels as well as the thermal efficiencies; and the calorific values of all three fuels may vary considerably, owing principally to their variable ash and moisture content. The Pittsburgh tests showed that about 10 tons of Pittsburgh coal was equal to 9 tons of coke, or $8\frac{1}{2}$ tons of anthracite when the fuels were burned in the Arco boiler; and to 10 tons of coke or 9 tons of anthracite when burned in the Dunning boiler.

"The Minneapolis tests showed that about 10 tons of Illinois coal was equal to $7\frac{1}{2}$ tons of coke or anthracite when burned in the smaller Capitol Winchester boiler, and equal to $8\frac{1}{2}$ tons of coke or anthracite when burned in the larger Capitol boiler.

"With the same attention to the fire, coke gives a much more uniform temperature than bituminous coal. In addition, coke is a clean fuel and makes neither smoke nor soot, an advantage difficult to express in exact figures. It is nearly as good a fuel as the domestic sizes of anthracite, and if anthracite is unavailable at reasonable prices a byproduct coke makes a good substitute.

TABLE I—EFFICIENCY OBTAINED WITH DIFFERENT FUELS WHEN THE BOILERS WERE ABSORBING HEAT AT RATE OF 2,500 B.T.U. PER SQUARE FOOT OF HEATING SURFACE PER HOUR.

Name of Boiler	Heating Surface, Square Feet	Grate Area, Square Feet	Thermal Efficiency. Heat Absorbed by Water in Boiler in Per Cent of Heat in Coal Fired			
			By-product Coke	Anthracite Coal	Pittsburgh Coal	Illinois Coal
Arco, No. 6-23-S.....	39	2.9	70	70	54	..
Dunning, No. 303-S.....	46	3.6	70	70	62	..
Capitol Winchester, No. 3450....	33	3.3	70	69	..	49
Capitol, No. 257.....	106	8.6	66	60	..	50

"The quality of the fuels used in the Pittsburgh series of tests was as follows:

"The anthracite was taken from the bureau stock. It was a mixture of egg and nut sizes, and was considerably cleaner than that ordinarily obtained in the Pittsburgh market.

"The Pittsburgh coal was also a mixture of egg and nut sizes. It was purchased from a local coal dealer, and was of good average quality.

"The byproduct coke was furnished by the Carnegie Steel Co., and was made in that company's byproduct plant at Clairton, Pa. It was domestic-size coke, similar to nut-size anthracite, and was taken from a stock bin containing a mixture of 60 per cent 21-hour and 40 per cent 19-hour byproduct coke. The coal from which the coke was made was a mixture of several coals from the Klondike region near Pittsburgh.

"The anthracite and Illinois coal used in the Minneapolis tests were purchased from local coal dealers. They were a mixture of egg and nut sizes, and were of good average quality.

"The byproduct coke was purchased from the Minnesota Byproduct Co., St. Paul, Minn., and was made from Eastern coal. It was of domestic size, similar to the nut-size anthracite.

"None of the three fuels gave particular trouble with clinker. Although the coke clinkered considerably more than any of the other fuels, the clinker was light and porous. It formed a circular disk covering the central part of the grate, and if the fire was not too hot, the whole disk was easily removed in one piece through the firing door. With a hot fire, the clinker was soft and broke into small pieces when an attempt was made to remove it. For this reason, the best time to clean the fire is in the morning when the fire is cool after the night period of low rate of combustion.

"The Pittsburgh and Illinois coals made practically no clinker. However, to offset that, a heavy deposit of soot formed on the surface of the boiler. If good results are to be obtained, the soot should be swept off the boiler's surface frequently, preferably every morning.

Rules for Burning Coke.—A complete set of instructions on how to burn coke in house-heating equipment has been given in Technical Paper 242. The following rules contain the instructions in condensed form:

"(1) Carry a deep bed of fuel; one about 18 in. thick gives the best results.

"(2) Use very little draft after the fire is started, and keep it always under control. The success of even heating depends on careful draft regulation.

"(3) Do not stir the fuel bed; clean the fire in the morning.

"(4) Use sized coke: $\frac{1}{2}$ to 2 in. for furnaces, boilers, and stoves; $\frac{1}{2}$ to 4 in. for open grates.

"(5) Do not allow ash to accumulate in the ashpit."

What American Coal Mining May Learn From Europe's Mines

With Limited Coal Resources That Continent Is More Conservational Than America and Spends More Labor and Capital to Save Coal—Depth and Thin Beds Also Reduce Output—Great Care Expended to Protect Life—Wage Provisions in Great Britain and Excellent Housing on Continent Reduce Discontent

BY JOHN T. RYAN

President, Mine Safety Appliances Co., Pittsburgh, Pa.



ABOUT 90 per cent of the world's coal comes from two areas, relatively small when compared to the total surface of the earth. One of these embraces the coal fields of the eastern part of the United States, and the other includes the fields of Great Britain, Germany, Belgium and northern France. The European area supplies about 40 per cent of the world's coal and about 45 per cent comes from the coal fields of the United States. For the first half of the year 1923 the data collected by our Geological Survey show a total production for the world of approximately 660,000,000 metric tons of 2,205 lb. The United Kingdom of Great Britain produced 21.5 per cent of this total, Belgium 1.6 per cent, France 2.71 per cent, the United States' percentage of the total being 44.18.

To give an idea of how the relative production has changed we will go back to the year 1865, when Great Britain alone produced 100,000,000 tons, which was four-fifths of the world's output, and the United States supplied only approximately 20,000,000 tons, which was 16 per cent of the total world production. Great Britain's output increased steadily until 1913, when it reached its peak with a production of 287,000,000 tons. In 1922 it produced 249,000,000 tons, but in proportion to the world's production its output shrank steadily, being 80 per cent in 1865 and only 21 per cent in 1922.

It is interesting to note also the trend of the production per miner per year during recent years. The output per underground miner in the United States in 1901 was 651 gross tons, and in 1918 it was 1,012 tons, whereas the output per underground miner in Great Britain decreased from 357 tons in 1901 to 301 tons, in 1918. As there are many more workers on the surface at the mines of Great Britain than at those of the United States, if the comparison was made for all employees the difference would be greater. Thus the production per man per day involving all employees of

the British mines in 1922 was only 0.95 ton, and the production per man per day in Belgium and France is now only about 0.6 ton, whereas in the United States in 1922 it was approximately 3.6 tons for all employees.

There are many causes for this great difference in the productive capacity of the miner. One vital reason is the fact that nature has not been so good to the European countries as to us. Their coal outcrops are comparatively few compared with ours. Few valleys are so deeply eroded as to expose the coal seams whereas in western Pennsylvania and West Virginia such exposures are relatively common. Then again the coal has been mined in Europe for a much longer time. In fact there are authentic records that coal mining was practiced over 1,000 years ago, and at a point near Dunfermline, in the West Fife coal field of Scotland, the monks were mining coal as far back as the year 1291.

NO LONGER ARE OUTCROPPING SEAMS AVAILABLE

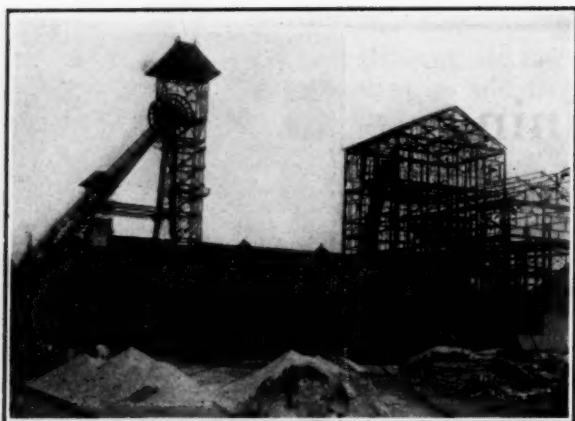
Naturally in the early years of mining in Europe coal miners followed the lines of least resistance, as we are doing in this country. They mined the seams nearest the surface, of the greatest thickness and the best quality without proper regard to the possibility of removing later the seams above and below. I would estimate that 90 per cent of the coal production in Great Britain comes from shaft mines from a few hundred feet to 3,500 ft. in depth and about 95 per cent of the production of Belgium and France comes from shaft mines.

Many of the mines in these latter countries descend to a depth of over 3,000 ft. and several are now being sunk which will go to a depth of 4,000 ft. In France and Belgium seams of coal are being worked as thin as 15 in. and some of these are at considerable depth. Few of the seams in their present coal fields are over 3 ft. thick. Practically all of the mining in these countries is by longwall.

In Great Britain there are fourteen separate coal fields. The thickness of the coal varies considerably in thickness, as does the number of workable seams. In the North Staffordshire field, as an illustration, there

Article entitled "Some Observations on Mining in Europe" read before the Coal Mining Institute of America, Dec. 19, 1923, at the annual session held at the U. S. Bureau of Mines, Pittsburgh, Pa.

The illustration in the title shows one of the many girls on the tipples of Scotland. Mr. Ryan says that this is one of the reasons why Sandy hates to leave his native heather. When Parliament, before the war, threatened to dispossess the girls of their jobs they sent a delegation of protest to London, and Parliament relented.



MINE NO. 11, LENS COMPANY, UNDER RECONSTRUCTION

This mine had been running twenty-five years when it was destroyed by the Germans. It is expected to be active for another 100 years.

are about thirty seams of coal having a thickness of 2 ft. or over, making a total thickness of 140 ft. A number of other seams range from 1 ft. to 2 ft. in thickness, making a total of 150 ft. of available coal. Many of the shafts from which they are now hoisting coal have been in operation for several hundred years. For instance one, at least, in the town of Newcastle-on-Tyne has been in operation for over 200 years.

Many of these old shafts were sunk originally to one of the thicker beds near the surface and after they were exhausted they were deepened to tap lower seams. In some of the shafts six or seven different seams are being worked. These old shafts were rather small, usually accommodating cars having a track gage of only 20 to 22 in. The cars, or "tubs," held about 800 lb. As these standards have continued with the deeper shaft workings and as the distances from the shaft have increased, one can readily form an idea as to the way in which these narrow gages and small cars reduce production.

TROLLEY WIRES EXCLUDED FROM BRITISH MINES

Another vital fact which affects production is the almost entire exclusion of electricity from underground workings. It is excluded absolutely for haulage purposes, as the British regulations state "Haulage by electric locomotives of the overhead trolley-wire system is prohibited in any of the coal mines." The same regulations are in effect in Belgium and France. This means that all their transportation is by rope, horses and man power, for, indeed, there is much of the latter at the working faces.

Labor-saving machinery is used comparatively little in the European areas described. Whereas about 65 per cent of the coal of the United States is mined by machinery, only about 15 per cent of the European coal is mined in that manner.

Two other factors that I think enter to a great extent in the decreasing production rate of Great Britain are the introduction of the seven-hour day from bank to bank, which means that the face worker works only five and one-half to six hours. The other is the fact that our miner here actually works harder and is much happier and more contented than the British miner. I do not believe, however, that our miners work any harder than the French and Belgian miners or are any more contented. Reference to the reasons for this statement will be made later.

Our American mining men will find little in European

production and mining methods of interest to them, for few of the practices in these mines can be applied to the conditions in the United States, unless, indeed, the mine operator is an optimist and expects to live 500 years longer. It will be approximately that length of time before we will be mining under physical conditions comparable with those faced at present in the coal fields of Europe.

Another condition which must be taken into consideration also is that in Europe the coal resources are not, as in America, almost unlimited, for with the average production in Great Britain of 250,000,000 tons per year the British will exhaust their present probable coal resources in 744 years, whereas the United States, at an average rate of production of 600,000,000 tons per year, will not complete the mining of its coal for 7,677 years.

Consequently in Europe they are obliged to pay more regard to the economic value of the coal in the ground and to the conservation of their coal resources. Taking these facts into account as well as the unfavorable natural conditions for mining as compared with our own, their engineers are doing a good job in the mining of their coal.

There are several phases of European mining, however, that American mining men would do well to study, for their effects will be reflected on this side of the Atlantic, and regarding these I desire to say something. Though our mining and production methods are not comparable, the question of "What's in the worker's mind" and how to keep the miner and his family contented is not dissimilar in the two great mining regions. The problems of education, living conditions, recreation and wages are matters which are important and comparable, and hence worthy of our consideration.

UNIFORM LAWS IN ENGLAND, SCOTLAND AND WALES

Then there is the big question of safety, and from the experiences, practices and mining legislation of the European countries we can learn much. Practically everything pertaining to safety in Great Britain is covered by regulations dating back to 1872, and revised from time to time to bring them up to date. The regulations are uniform for all the mining districts of England, Scotland and Wales, which is a great advantage from the standpoint of safety.

In addition to the Coal Mines Act, which was codified and modernized in 1911, the Secretary of State may by order make such general regulations as may appear best



WINTERSLAG COLLIERY, NORTHEASTERN BELGIUM

A mine in a new field. It employs 5,500 men, about 4,000 being underground workers. The output per day is about 2,300 tons.

calculated to provide for the safety, health, convenience and proper discipline of the persons employed in and about the mines. This provision of the act has enabled the Mines Department to put into effect in recent years a number of general regulations pertaining more particularly to rescue work, safety lamps, use of explosives, coal-dust explosion hazards and the like.

For convenience, the fourteen separate coal fields are divided into six separate divisions by the Mines Department. The staff of inspectors in addition to the chief and deputy chief, consists of six divisional inspectors, fourteen senior inspectors, thirty-two junior inspectors, twenty-one sub-inspectors, eight quarry inspectors and eight horse inspectors. Each of the six divisions has a divisional inspector, from one to four senior inspectors and from two to six junior inspectors, and sub-inspectors depending upon the size of the division. The rates of pay and cost of living bonus are as follows:

Divisional inspector	\$5,000 to \$6,250
Senior inspector	3,850 to 5,000
Junior inspector	2,500 to 3,500

The inspection department is made up of high-grade, well-paid, efficient men, and the department has the necessary power to enforce uniform regulations. The average rate of pay to the British miner is only one-half to one-third of our miner's pay, whereas the salary of the inspector is about double the average received by our inspectors. This comparison is a great discredit to the United States, and our mining men should take steps to increase the salaries of our mine inspectors, paying them more nearly what they are worth, and building up the departments for an even better inspection service in the future. We should also take steps to bring about more uniform regulations in all our coal-mining states.

The Belgian and French regulations are, if anything, more severe than in Great Britain. In France the government holds title to all the coal land and leases it by grants or concessions, and the safety of the mines is under the control of the government inspection corps, which has the power to make and enforce regulations. It is a well-paid, highly efficient body of men, and that fact is reflected in the excellent accident record of the mines it supervises. The death rate from accidents in and about the mines in Great Britain per 1,000 persons employed has dropped from 2.24 in the year 1873 to 0.95, or less than one, in 1922. The death rate for each million tons of coal raised decreased from 7.42 in 1873 to 4.32 in 1922.

Statistics for the United States in the same period show that in 1873 the number killed per 1,000 was 5.46 and the number killed per million net tons mined was 10.06. In 1922 the number killed per thousand employed was 2.3, and the number killed per million net tons mined was 4.3.

WHY FALLS CAUSE LARGE PART OF ACCIDENTS

In analyzing and comparing the causes of accidents, we find that in Great Britain in 1922, falls of roof were responsible for 55 per cent of all the underground accidents, and haulage accidents for 21 per cent. In the coal fields of the north of France for 1922, falls accounted for 71 per cent of all underground accidents and haulage for 14 per cent.

In the large coal fields of the north of France, producing about two-thirds of France's total output, it is interesting to note that the death rate in 1922 was only



PLANT OF LENS COMPANY NOW NO LONGER IN RUINS

The plant which preceded this was destroyed only a few days before the armistice, but it had been under fire for no less than four years. Order and permanence are distinguishing features of European mines.

one per two thousand men employed, and there was not a fatality from either gas or coal-dust explosion. Yet this in a field in which all the mines are gaseous, very deep and dry. This field, employing 100,000 men, has not had a gas explosion since 1917.

The statistics for both of these countries show that the larger percentage of accidents occurs from falls—even a greater percentage than in the United States, for in 1922 only 50 per cent of our underground fatalities were from this cause. The reason for this higher percentage in the European countries named is that the roof they have to control is much worse. They have cut down fatalities from other causes to a greater extent than we have, and in consequence the percentage of accidents from falls and haulage accidents looms higher than it would otherwise.

In France centralized rescue stations have been erected to serve all mines, but the regulations also require that each mine must have on hand two sets of apparatus. The French had a fine central rescue station at Bruay, in the northern field, before the war, but it was completely destroyed by the Germans. However, they are now just completing a magnificent central station near by Bruay but on the outskirts of the city of Lens. This would cost, if duplicated in this country, about \$300,000.

The wage problem and method of determining the wage scale is an interesting phase of European coal mining, and particularly in Great Britain. It is so badly complicated there that it almost takes an accountant to figure it out. I will endeavor to give you briefly the operation of the national wage agreement as contained in the annual report of the Secretary of Mines of Great Britain for 1922:

"The object of the agreement is to provide machinery by which wages may from time to time be automatically adjusted in accordance with the selling price of coal. Its purpose is that the proceeds available for wages and profits (i.e., the gross proceeds less costs other than wage costs), commonly known as the 'net proceeds,' shall be shared in an agreed proportion which works out at about 85 to 15, or, in other words, of every £100 available, wages are to have about £85 and profits about £15.

"For instance, if the 'net proceeds' per ton are 12s.6d., wages are to be paid at such a level as will make the wages cost per ton 10s. 8d., leaving 1s. 10d. profit; if they are 15s. the proportions will be 12s. 9d. and 2s. 3d.;



BICYCLE GARAGE AT WINTERSLAG COLLIERY

About 4,000 bicycles can be stored in this building. In Europe miners ride to work on bicycles instead of in Fords.

if 17s. 6d., they will be 14s. 11d. and 2s. 7d.; if 20s., they will be 17s. and 3s., and so on.

"This is to be secured by determining the actual amount of the 'net proceeds' during a period of two months and fixing a percentage to be added to basic wage rates during a future two-month period, at such a level that wages will absorb, during that period, a sum equal to the agreed proportion of the amount of the 'net proceeds' during the past period.

WAGES MUST NOT FALL BELOW FIXED LEVEL

"This process is, however, subject to one important qualification: That the miners' rate of wages per shift must never fall below a certain specified level. If 85 per cent of the 'net proceeds' shown by any ascertainment is insufficient to pay wages at this guaranteed level, the 15 per cent must be encroached upon or foregone altogether, or even a sum greater than the whole amount of the 'net proceeds' must, if necessary, be provided. When the agreed share applicable to profits is thus diminished, the owners are entitled, according to the actual terms of the Agreement, to recoup themselves in certain circumstances for some part of these overpayments, but in all ordinary circumstances this provision, for reasons which it is unnecessary to examine here, will be inoperative, and the owners in fact must write off their losses at once.

"In theory, of course, this principle might be applied to any unit, from the single mine at the one end of the scale to the whole of the British coal fields at the other. In practice, the unit is the 'district'; that is to say, a number of mines geographically adjacent to one another, the natural conditions of which are similar. Great Britain is divided into thirteen such districts.

At the base of this national agreement is also a minimum-wage provision which guarantees the men a minimum daily wage which at the present time is approximately, for the average of all the districts, 9s. per day, and this is arrived at in the following manner: Before the war the average daily wage of the miner was approximately 4s., or \$1. During the war the base rate was increased 50 per cent, or from 4s. to 6s. In 1919, when the working day was decreased from eight to seven hours, the pieceworkers were awarded an increase of 14.2 per cent for the loss of this one hour, but this did not include the daymen. This was known as the Sankey Award. After the strike of 1921, which brought about the national wage agreement on the profit-sharing basis, the base rate was increased an additional 28 per cent, making it now approximately 9s., or \$2.07.

The average wage of the 1,129,539 men employed for 1922, working an average of 251 days a year, was 9s. 11½d. per day, or \$2.29 in our money today.

In addition to the provisions of the national wage agreement and the minimum wage there is an unemployment wage, or "dole," which is paid by the government.

BIGGEST PAY IS \$1.33 PER DAY

In France the wage scale is based on the average pre-war wage plus a percentage equivalent to the increased cost of living as compared with the pre-war cost, subject to variations due to the number of dependents. The French mines have been practically free of wage controversy since the war, but in November of last year they had a suspension of a few days' duration, as the men asserted that the wages had not been adjusted to take care of recent increased costs of living. This controversy was settled by granting an increase varying from 1 to 3 fr., which in our money would be 5c. to 15c.

The average wage for men working at the face, prior to this last advance, was 25 fr. per day or the equivalent of \$1.33 in our money.* The average for outside work was 17 fr. (\$0.90) per day, and the majority of this outside work is done by girls. The average for all men and boys about the mines is 17 fr. (\$0.90) per day. Children from 13 to 15 years of age made from 2 to 5 fr. (10c. to 26c.) per day. The 8-hour day is in general operation.

A study of how the miner lives, what he does above ground, what provisions are made for the comfort and welfare of the family in these European countries will

*Figured at 5.32c. per franc. It is now just about 5c.

EARNINGS OF MINERS IN THE SEVERAL DISTRICTS OF GREAT BRITAIN

District		Average Earnings Per Manshift (All Classes)		Period During Which District Was on the "Minimum"	Average Number of Shifts Worked Per Year	Average Earnings Per Man Per Year		Average Output Per Man Per Year	
		s.	d.			£	s. d.	Tons	
1	Kent.....	12	9½	\$3. 11	Whole year	254	162 5 11	\$790. 38	255
2	Eastern.....	11	7½	2. 83	1 month	242	140 5 9	683. 20	247
3	Cumberland.....	9	10½	2. 40	Whole year	252	124 3 8	604. 77	175
4	South Wales and Monmouth.....	9	7½	2. 35	Whole year	263	126 17 0	617. 76	221
5	Scotland.....	9	7½	2. 34	8 months	272	130 16 7	637. 14	269
6	Lancashire, North Staffordshire and Cheshire.....	9	3½	2. 26	7 months	231	107 4 3	522. 12	169
7	Durham.....	9	1	2. 21	7 months	247	112 5 4	546. 74	220
8	Northumberland.....	8	7½	2. 11	5 months	258	111 11 10	543. 45	224
9	North Wales.....	8	2½	2. 00	10 months	266	109 3 10	531. 76	175
10	Bristol.....	7	11½	1. 94	8 months	263	105 3 11	512. 30	147
11	Somerset.....	7	10	1. 91	5 months	242	94 14 11	461. 41	162
12	Forest of Dean.....	9	9½	1. 89	11 months	262	101 17 1	496. 03	179
13	South Staffordshire and Shropshire.....	7	7	1. 85	Whole year	273	103 7 9	503. 50	226
Average for all districts		9	11½	2. 43		251	125 2 0	609. 24	226

This table is based on normal exchange, \$4.87 per pound sterling. The present rate is \$4.34, or 11 per cent less.

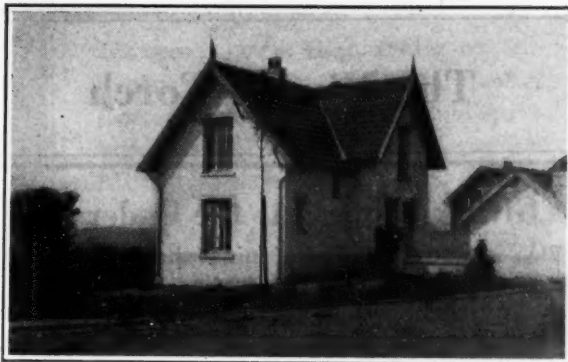
be of interest. Great Britain has been backward along these lines, particularly in the way of proper housing, recreation facilities and miners' baths, etc., but recently steps have been taken to correct this by the Miners' Welfare Fund, established under the Mining Industry Act of 1920, "for the purpose of improving the essential wellbeing, recreation and conditions of living of the workers in, or above, the coal mines and for mining education and research." This fund is maintained by a levy upon all collieries of 2c. per ton of output over a period of five and one-half years. This levy will create a fund of approximately \$5,000,000 per year.

Bathhouses, or washhouses, as we term them, are practically unknown in Great Britain and only a handful of collieries are equipped with them and then only partly so. When you go across the channel to Belgium and France and visit their mines one of the first things to strike your eye is their magnificent bathhouses, the construction of which is required by law.

Due largely to the thin seams, the great depth at which they are found and the severity with which they are faulted, coal can be mined in France only by the exercise of unusual engineering talent. Perhaps for this reason all the officials down to the sub-foreman must have technical training. They do their mining work well and take excellent care of the safety of their men, but what excites most interest in the visitor is the manner in which they take care of the miner and his family on the surface. Fine homes with large gardens have been provided. Good playgrounds, unrivaled recreation facilities and good schools make life happy for the children. Some of the houses just constructed in the devastated area are equipped with running water and electric lights and are provided with a large plot of ground. Double houses of ten rooms cost 50,000 fr., which would represent in our money today about \$2,700. They rent for 10 to 15 fr. per month, or from 55c. to 85c.

One naturally wonders how with the working conditions worse than in Great Britain, on account of the low seams, the French operators can run their mines with a much lower wage scale and yet have far fewer labor disturbances and keep their men better satisfied. I believe the biggest factor in promoting this condition is the manner in which the operator takes care of the miner and his family on the surface.

A word about the devastation of the French coal mines by the Germans. The coal basin located in the northern part of France spreads over a large part of



NEW MINER'S HOUSE AT LENS, FRANCE

The French companies are rebuilding homes at a rate of 5,000 a year, replacing those destroyed by the Germans.

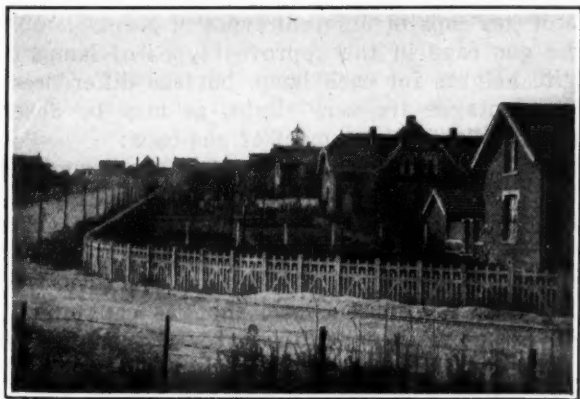
two departments, or counties, the Nord and the Pas de Calais. This basin is an extension of the Belgian coal field. It extends practically across northern France, and its width ranges from ten to twenty-five miles.

Here also is the industrial center of France. It was invaded by the Germans, Aug. 24, 1914, their lines extending to the vicinity of Lens and Béthune. They captured about 80 per cent of the mines. The battle lines of this particular section varied but a few miles from 1914 to 1918. When the invasion took place it was so rapid that little destruction was done, and the mines captured were practically unaffected. In consequence the Germans were able to work them continuously until about Nov. 1, 1918.

TWO HUNDRED AND TWENTY SHAFTS RECONSTRUCTED

When they started to retreat and knew they were defeated and would not come back, they wilfully destroyed a total of 124 pits having 220 shafts. One hundred and forty of the shafts were dynamited. Practically all the surface plants were entirely destroyed. Out of a total of 30,000 miners' houses in the area, 16,000 were totally destroyed and most of the remainder badly damaged. The Germans occupied and worked these mines during the entire war but, though when they gutted the French mines they completely destroyed them, they left the Belgian mines practically intact.

The French have done wonderful work in the reconstruction of their mines and their mining towns, and they will complete this reconstruction work several years earlier than the best engineers estimated it could be done. It has been a remarkable accomplishment, and it is no wonder that the French who have had to provide the money for this re-establishment of the industry feel keenly the necessity for collecting reparations from the Germans.



CITÉ IN LENS REPLACING VILLAGE GERMAN'S BURNED

House construction at European mines is no more a source of profit to European operators than the houses in American towns are to the operators of America.

LIQUID OXYGEN THOUGHT DANGEROUS IN COAL MINES.
—Liquid oxygen explosives are being extensively used in France and Germany in metal mining and quarrying operations, according to George S. Rice, of the U. S. Bureau of Mines, who recently returned from a trip to Europe. This type of explosive is not, however, being employed in coal mines because of the assumed danger of causing coal dust explosions. Tests employing liquid-oxygen explosives in quarries and metal mines in the United States are now being made by the Bureau of Mines at Pittsburgh, Pa., and at other field stations, Congress having at the last session, appropriated funds for the work.

The Miner's Torch

Giving Thought to the Under Dog

NOT long ago a friend of mine who is superintendent at a large coal-mine operation said to me in conversation that he wished he could find some bosses who would show enough interest in the company that employed them to fight for it if necessary; he said it earnestly, indicating that he had been giving the matter much thought. By way of continuing the conversation I asked him if he had ever had any men in his employ for whom he had been tempted to wage fight with his superiors to get for these men all that he thought was coming to them, or had he ever even mentioned any of these men to his superiors. His answer was not very satisfactory nor has his manner toward me been very cordial since.

A few days later I saw an article in a political monthly indicating that the labor legislation next proposed would endeavor to make a workingman's job something that could be depended upon in fair weather and foul. The argument for such a measure was something like this: Property rights are guaranteed to owners under our laws, and without such guarantees property would have little value. Certainly a laboring man's job is just as important to him and his family as property is to a land-owning farmer and his family, and it is just as reasonable to protect one by law as it is the other. I cut out the article, affixed my initials and mailed it without comment to my friend the superintendent, and as yet he has not acknowledged it.

I happen to know that this man has inaugurated an employment system that requires from each applicant for employment almost a life history, a doctor's examination, and a file of testimonials or references that are of equivalent value. He takes no chances at getting into his employ men who are likely to be injured because of inherited or previously acquired physical infirmities and in this way he keeps down to a minimum the payments required by the Workingmen's Compensation Act. If any of his employees lose a leg or an arm or an eye he tries to arrange a settlement with them that will be truly a final settlement so that they will seek employment elsewhere. He has stated publicly time and time again that he has a perfect horror of seeing cripples around his operations.

There is nothing peculiar or unusual about my friend's viewpoint on the accident question. Every superintendent who has been connected with mining operations for a number of years can recall times when it looked as if his company must surely become a bankrupt because of damage suits won or pending, and to such the merest mention of the words "claim for damages" is sufficient to produce a spell of "nerves."

But—every man feels that he has a right to earn a living, be he lame, halt or blind and unless more of our higher-ups forget the extremes of the past, when the ambulance chasers were in the saddle, and pay more attention to the extremes being inaugurated by the employment departments of the present day, the employees who are willing to fight for the employers will entirely disappear from the face of the earth and the labor problem will be a sure-enough problem. If you think

I am unduly worked up over this matter get your employment manager to show you his files of employment applications with all of the pertinent correspondence attached and note the comments added on the margins, then try to place yourself in the position of the men whose names are signed to the application.

Or, better yet, just drop in on your employment manager occasionally and listen in on the conversations between the applicants and the questioners, also the comments being made about rejected applicants when there are no applicants in the office and your "help" is in reminiscent mood.

For Flame Safety Lamps, Which Is Best: Flat or Round Wick?

BY J. W. PAUL

Chief of Coal Mine Investigations, U. S. Bureau of Mines,
Pittsburgh, Pa.

For a given percentage of gas the height of the gas cap in any lamp depends upon the temperature of the testing flame and the draught of the lamp. The hotter the flame the longer will be the cap. By special construction the cap may be elongated, and this may be accomplished by surrounding the flame with a small cylinder, usually of glass, which prevents loss of heat by convection or radiation. However, with the low percentage of gas, from 1 to 2 per cent, the heat evolved by the testing flame and the gas cap is not sufficient to increase materially the gas cap over that which is obtained with the ordinary lamp unequipped with the special chimney.

In determining the height of gas caps the reduced flame of the lamp is used, and this testing flame is approximately 0.1 in. high measured from the top of the wick holder. All gas-cap flames should be measured from the top of the wick holder as the line of demarcation between the test flame and the gas cap becomes lost after passing 2 per cent of gas.

Up to that percentage there is little difference in the length of the gas cap as shown in lamps used for general purposes, and in 2-per cent gas the round and flat wick lamps of the same design give the same gas cap; in 2½-per cent gas the round wick of one make of lamp gives a gas cap 0.05 in. larger than the flat wick and above 3 per cent the flat wick gives the higher cap.

The Bureau of Mines will soon have ready for distribution a bulletin on the miners' flame safety lamp in which elaborate data will be given on gas caps, also a number of charts giving a reproduction of the appearance of gas caps in different types of safety lamps.

The gas caps in the approved types of lamps have definite heights for each lamp, but the differences for low percentages are very slight, as may be observed from the following statement of gas caps:

With 1 per cent of gas the gas cap ranges from 0.15 in. to 0.3 in.; 2 per cent gas, 0.4 in. to 0.5 in.; 3 per cent gas, 0.6 in. to 0.9 in.; 3.5 per cent gas, 0.9 in. for round wick to 1.7 in. for flat wick; 4 per cent gas, 1.3 in. for round wick to over 1.7 in. for flat wick. With 4 per cent gas, the gas cap on all the approved lamps, except one round wick type goes above the top of the glass globe, and by interpolation the particular round wick cap reaches the top of the glass globe with 4½ per cent of gas.

Discussion presented Dec. 19 at the meeting of the Coal Mining Institute of America in Pittsburgh, Pa.

Sees Revolutionary Era Just Ahead Of Coal Industry



Impressed with High Order of Intelligence of British Coal Men, *Coal Age* Correspondent Stresses Mutual Advantage of Exchange of Experience with Mining Leaders in This Country

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

THE coal industry in South Wales has profited greatly by the employment of private cars for the transportation of its product. Now that the railroads in England have been grouped, there is some agitation on the part of the carriers for the pooling of cars or for the absolute change to a system car basis. This is opposed by most mine operators. The British law provides that the railroad must supply side-track facilities sufficient to take care of all cars offered. This is a great asset to the producers as they can hold their own cars under load as long as they wish without demurrage. It allows great flexibility in being prepared for any sudden demand such as the simultaneous arrival of a number of ships. In the north of England the cars are largely railroad owned as in America.

There are other reasons, in addition to the desire to do away with private cars, why the consolidation of railroads is not popular among the Welsh coal operators. Before the grouping each of the separate lines was anxious to offer some inducement to obtain business. Now with one system the railroad is much less obliging, it is asserted.

The Great Western R.R., which has absorbed the other lines in southwestern England and in south Wales, is taking an active interest, however, in stimulating the demand for Welsh anthracite. The railroad is more interested in expanding the domestic market for that fuel, which the British have not learned to use extensively, than it is in promoting export trade, because the former trade has for it greater tonnage possibilities. The road, however, is anxious to encourage exports as well, as a larger volume of production would reduce costs.

SUPERIORITY CLAIMED FOR WELSH ANTHRACITE

Officials of the Great Western were much pleased when American orders were placed for Welsh anthracite prior to our anthracite strike, as the wide publicity given the fact that Americans were sufficiently desirous of obtaining that coal to pay for its transport across the Atlantic had a psychological effect on the people of England. Thought is being given a plan whereby the Great Western and the Welsh anthracite owners may join in an effort to popularize the use of anthracite in Great Britain. A slight superiority over our anthracite is claimed for the Welsh product.

One of the outstanding things which impressed me in my contacts with the British coal industry is the high order of intelligence among the men who conduct it. The brain power of the industry is not confined to the principal executives. It is much in evidence all the way down the line, even to the subordinate grades of employees. It seems to me that it is a mistake not to have closer relationships between the men engaged in the coal business in the two great coal-producing nations. One of the lessons of the war has been that it is difficult for

one nation to be prosperous unless its neighbors also are prosperous. Great Britain, for instance, has learned that its own prosperity depends to a great extent upon the prosperity of Germany. Many of our own industries have suffered severely, and all of them have been hurt to some extent, by lack of prosperity in Europe. It is particularly the case that anything which contributes to the prosperity of Great Britain contributes directly to our own prosperity. Since coal is the basis on which British trade is built, the United States would suffer were that industry to languish. At any rate, there always should be co-operation in the exchange of experience and in developments which promote efficiency in the industry as a whole.

INDUSTRIAL TREND CALLS FOR CLEAR THINKING

The coal industry is on the threshold of an era of revolution. The advent of the internal-combustion engine, the increasing demand for the byproducts of coal and the burning of coal in large central power plants with the distribution of the resulting power as electricity, are examples of trends already exercising far-reaching effects. If the coal industry is to keep step with world progress and with progress in other industries, all of its brain power should be co-ordinated. A long step in that direction has been taken by the recent agreement between the governments of the United States and of Great Britain correlating their mining research.

Much constructive work could be done were machinery set up for the systematic consideration of problems common to the British and American industries. But lacking that, I believe there would be actual profit to the average American coal operator and to the average British operator in paying occasional visits to the other country. My experience with the British operators leads me to think they would take the broad view of any exchange of helpful information. An occasional one might take the position that a competitor—just at this time he might have to say "potential competitor"—should not be given the advantage of British experience, but that view would be held by very few.

BRITISH COAL INDUSTRY CAN LEARN FROM AMERICA

While there is much the American industry can learn to its advantage in British coal mines, there is also much the British can learn here. Now that the British are confronted with the absolute necessity of pulling up their low output per man and have turned definitely to a mechanical program in underground workings, one way in which they could benefit materially would be by visiting those mines in this country which now are so thoroughly equipped in a mechanical way.

This is the concluding article in the series written by Mr. Wooton as the result of his observation of the British coal industry.

New Western Maryland Ry. Coal Pier Is Electrically Operated

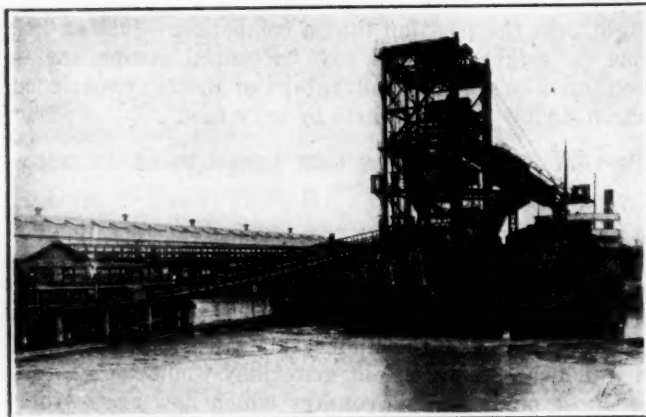
UTILIZING the site and foundations of the original gravity pier of the company, which was built in 1904 and destroyed by fire in September, 1919, the Western Maryland Ry. has constructed a new coal pier at Port Covington, Baltimore, that is operated by electricity. The original pier was of the timber trestle type, with forty coal pockets—twenty on each side—through which coal was transferred directly from cars to ships by gravity. This pier was 60 ft. high and 1,200 ft. long, extending 729 ft. out from the shore on timber piles.

The equipment of the new pier consists of a stationary car dumper of the lift and turnover type, with mechanical trimming apparatus for loading boats directly from the dumper pan, and an auxiliary conveying system and trimming apparatus to permit the loading of boats on the side of the pier opposite that on which the dumper pan is located. All of the pier equipment is electrically driven by direct-current motors, power being supplied at 230 volts from a 1,500-kw. rotary converter substation located on the pier.

CAR OVERTURNED WHEN DUMPING

As soon as the loaded car has been properly stopped on the cradle the operation of the cradle hoist is started. The starting of the hoist automatically shoves the car, which is now resting on a platen mounted on rollers, over to the side of the cradle and clamps it securely in the cradle, after which the cradle starts on its upward trip. When near the upper limit of travel the cradle strikes a turning pin and starts overturning, continuing until the car has been turned through approximately 150 deg., and spilling the coal onto a pan, which in turn empties into a chute reaching into the hold of the vessel being loaded. The illustration shows the dumper with a car completely overturned in the dumping position, and with the end of the loading chute in the hold of a vessel.

The dumper is designed to handle 100-ton capacity cars, although at the present time 50-ton capacity cars are being used. It is estimated that the maximum amount of coal that can be handled with 50-ton capacity cars per day (two 10-hour shifts) is 25,000 to 30,000 tons; with 100-ton capacity cars this would be increased to 40,000 to 50,000 tons per day.



VIEW OF PIER AND INCLINE

The electrical drive operates the turnover dumper, which turns the car through 150 deg., thus delivering the coal into a chute that carries it directly into the hold of the vessel.

As an auxiliary to the car dumper, the pier is equipped with a conveying system, a small storage bin and an auxiliary chute and trimming device. This auxiliary equipment permits the bunkering or loading of a vessel on the side of the pier opposite that on which the dumper is located. To put this auxiliary equipment into service, the hopper forming part of the main dumper pan is designed with a movable bottom plate in such a way that when this plate is hoisted the neck of the hopper connecting with the loading chute is cut off and the coal delivered directly into the vessel.

The control of the two barney haul motors is accomplished by means of two full magnetic type controllers designed to control the operation of the two motors in multiple from a single master controller. This controller is of the plain reversing type with armature shunt points provided for slow-speed operation. The principal feature in connection with the barney haul-control equipment is the method used for interlocking with the barney gate-control equipment and the methods provided for automatic slowdown. This is accomplished by the use of geared limit switches of the traveling nut type. The barney gate mechanism also is provided with a limit switch of the same type, and the scheme is worked out so that it is impossible to move the barney before entering the track gates unless these gates are in the correct position. The same switch also gives slowdown when approaching the upper limit of travel. The equipment was designed and manufactured by the Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.

THE WADGE and the Wolf Creek coal beds of the middle group in the Twentymile Park district of Colorado, according to a Bulletin 748 of the U. S. Geological Survey, are remarkably regular in thickness and distribution, ranging in thickness from 5 to 20 ft., and the beds in the lower group are remarkably irregular in both thickness and distribution. On Oak Creek the Pinnacle coal bed probably is the most valuable bed of the group, and persistent efforts have been made to show that this bed is the one worked on Yampa River near the mouth of Indian Creek. However, the thick coal beds on Oak Creek break up and diminish in thickness toward the west, and coal bed No. 3, which overlies the Pinnacle, is the only valuable one in Dunkley Canyon. Hence, the Pinnacle bed probably is not present at the mouth of Indian Creek, the beds mined there being members of No. 3 on Oak Creek, which here has expanded into a group.

USE OF ROCK DUST OBLIGATORY IN EUROPE.—In Great Britain and France, says George S. Rice on his return from a trip to Europe in behalf of the U. S. Bureau of Mines, the employment of rock dust as a screen or barrier for the limitation of coal-dust explosions to the immediate area of the explosion has been made compulsory. The efficacy of this method was strikingly demonstrated in the case of a gas explosion in a Yorkshire colliery, where the stone dusting confined the explosion to its immediate place of origin and prevented the great loss of life that must have occurred had the explosion spread through the mine. Much experimental work along this line has been performed in the United States by the Bureau of Mines, but the states have as yet enacted no legislation to compel the adoption of this system in the mines of the country.

News Of the Industry

Work Rejects Retailers' Plea to Abolish Government Fuel Yard

Secretary of Interior Says Retailers' Proposal Would Cause Loss of 37.6-49.5c. per Ton to Taxpayer—Suggests Restudy and New Proposal—Cost Compilations Differ

The taxpayer would suffer, says Dr. Hubert Work, Secretary of the Interior, were the government to accept the proposal of the National Retail Coal Merchants' Association to abolish the Government Fuel Yard and turn over the business of supplying the departments with coal to the Washington retailers. "Upon analysis of the proposals and of the figures taken from the records of the fuel yards," says Secretary Work in denying the plea of the retailers, "it appears that acceptance would result in the net loss to the taxpayer of 37.6 to 49.5c. per ton."

Secretary Work also makes the point that the retailers' proposal fails to give any satisfactory guarantee that any losses incurred by the retailers in handling the government's business would not be made up by additional charges against private consumers in the District of Columbia. In his communication, however, the Secretary resubmits this question: "At what margin per ton above mine cost and freight are the merchants prepared to sell coal of the various grades in the district?" To this Secretary Work adds: "It is possible that, on restudy of the matter, you may be able to propose a scale of margins that will permit the government to turn over to the local merchants the handling of all of its coal business in the District of Columbia."

Another point made by the Secretary of the Interior is as follows: "The taking over by the local merchants of the

unloading, trucking and delivery of coal to the curb, as proposed, would not relieve the government of the cost of purchasing the coal, making payment to mines and railroads, collecting from the departments, auditing accounts, weighing and inspecting all coal as provided by statute, arranging for and inspecting stowage, demurrage and loss, if any, between mine weights and delivered weights, interest on capital used in performing these functions and amortization of the investment in the present plant (less salvage) or cost of holding the yard in standby condition in the future. All these items have been urged by you as entering into the true cost of handling coal, as indeed they do."

In his reply to the retailers, Secretary Work submitted the accompanying comparison of present Fuel Yard costs with those which would prevail under the terms of the dealers' proposal.

With his reply Secretary Work made public the brief submitted in this connection by the National Retail Coal Merchants' Association. At the request of Secretary Work, this brief has heretofore been withheld from publication.

In a letter accompanying the brief of the retailers Roderick Stephens, chairman of the Government Relations Committee of the merchants' association, reiterates portions of the brief, stating that "the retail merchants in the District of Columbia have storage and han-

dling facilities more than adequate to supply coal to the government departments at all times, as well as to serve the local trade.

"The operating costs of the Government Fuel Yard have conformed to the 'government system of accounts,' but they have not included all direct or indirect costs of doing business," says Mr. Stephens. "Although the published cost for the period July 1, 1916, to June 30, 1921, was slightly less than \$1 per ton, the real cost per ton to the government of unloading cars, storage and delivery, including indirect overhead expense, arrived at after complete agreement between officials of the Bureau of the Budget, Government Fuel Yard and National Retail Coal Merchants' Association, for the same period was found to be \$1.78 per gross ton. Therefore by turning this business over to the retail dealers, at their agreed figure of 92c. per gross ton, the government will effect saving of 86c. per ton, or upward of \$1,000,000 in the period covered by the attached bids."

Pittsburgh-Great Lakes Co. Merger in Ohio

Merger of the Ohio properties of the Pittsburgh Coal Co. and the properties of the Great Lakes Coal Co., which had been operated by the Columbus (Ohio) office of the Pittsburgh Coal Co., has been completed under the name of the New Pittsburgh Coal Co. Papers of incorporation have been taken out at Columbus and the new company, with an authorized capital of \$2,100,000, will have charge of the operation of all properties and the sale of the product. The general offices will be in the Rowlands Building, Columbus, with C. G. Weitzell as president and J. A. Rundio sales manager.

The property consists of large mines in the Hocking Valley, eastern Ohio field, Pomeroy Bend field and in Kentucky. The Kentucky property has one operating mine with a capacity of 2,000 tons daily at Betsy Layne, on the Big Sandy division of the Chesapeake & Ohio R.R. This property will be further developed to a point where the output will be 5,000 tons daily. The eastern Ohio mines are on the Wheeling & Lake Erie and are located in Harrison, Jefferson and Belmont counties. The Hocking Valley mines are on the Hocking Valley R.R. and the Pomeroy Bend mines also are important operations. The Great Lakes Coal Co. formerly was a P. Reiss interest. The merger became effective Jan. 1.

COMPARISON OF PRESENT FUEL YARD COSTS WITH THOSE NECESSARY UNDER TERMS OF DEALERS' PROPOSAL

Proposed Plan		Present Plan	
Dealers' average bid for unloading, trucking and delivery.....	\$0.920	Fuel Yard legal cost fiscal year 1923.....	\$0.850
Cost to government of coal purchase, auditing, bookkeeping, etc. (At new compensation schedule rates for force employed).....	0.120	Degradation cost on anthracite.....	0.006
Cost to government of weighing and inspecting coal as required by Act March 15, 1898.....	0.080	Indirect cost to taxpayer.....	0.372
Cost to government of inspecting deliveries and storage.....	0.024	Interest on liquid capital \$200,000 at 5½%.....	0.056
Cost to government for demurrage and guarantee of railway weights.....	0.100	Total cost per ton to taxpayer.....	\$1.284
Investment less if yard be abolished, prorated on coal deliveries of five years.....	0.479		
Interest at 5½ per cent on liquid capital of \$200,000.....	0.056	Net loss per ton to taxpayer.....	0.495
Total cost per ton to taxpayer.....	\$1.779		
Total cost per ton to taxpayer if yard be kept in standby condition and deliveries resumed at end of period.....	1.660	Net loss per ton to taxpayer.....	0.376

Supreme Court Sustains Recapture Clauses

The right of Congress to divert the earnings of the stronger railroads to the relief of the weaker, as provided for in Section 15A of the Transportation Act—known as the "recapture clauses"—was declared constitutional in an opinion handed down by the U. S. Supreme Court Jan. 7. Chief Justice Taft wrote and read the opinion. The Dayton-Goose Creek Ry., a small line in Texas, was the complainant, but nineteen of the largest railroads in the country joined in the contention that the recapture clauses were invalid. Chief Justice Taft, in his opinion, upheld the Federal Court for the Eastern District of Texas, which dismissed the original complaint by the Dayton-Goose Creek company.

Southern Gem Corporation In Hands of Receivers

The Southern Gem Coal Corporation, of Chicago, is in the hands of receivers. On Jan. 2 Federal Judge English, in East St. Louis, granted the petition of W. S. Wilson, of Pinckneyville, Ill., and seven other creditors and appointed Mr. Wilson, a veteran Illinois coal man, and Judge C. B. Thomas, a federal referee in bankruptcy, as receivers. Officials of the Southern Gem Corporation said they had had no notice of the petition and that since the major creditors and stockholders of the concern were not in favor of the receivership, they probably would ask the court to lift it. The corporation has been operating mines in several Illinois counties.

Simon Levy, of the Boylston Coal Co. of Chicago, a direct-to-consumer dealer, who signed a five-year contract for the entire output of the two Franklin County mines of the corporation, thereby putting about 1,500,000 tons of Franklin County coal into snowbird trade, said he thought his contract was bullet-proof and that the receivership would not interfere with the delivery of the coal to him. He said on Jan. 5 that deliveries had already started. Others interested said the receivership doubtless would upset the snowbird contract, which has caused such consternation among Illinois coal men.

In the receivership petition, signed by Mr. Wilson, the Wilson-Richey Stores Co., Sherman S. Richey, W. T. Richey, William Crawford, George F. Meade, Ephraim Cliburn and Alex Wilson, it is set up that the Southern Gem Coal Corporation is bankrupt through mismanagement and the payment of exorbitant salaries to officials and that bond issues have been floated on the Perry County mines and on the two Franklin County mines in order to prevent payment of creditors' claims. The receivers took over control of the mines as well as the Wabash, Chester & Western R.R., a short line in southwestern Illinois, a large lumber company, an insurance company, an automobile sales agency and a sales agency for handling the coal.

Slidin' on the Levee

River coal operators on the levee at Louisville, Ky., had their troubles on Jan. 2, when the levee was covered with glaze, from a freezing rain. Trucks could not negotiate the hill from the water level, and about a dozen trucks and cars were pulled out of the river during the morning, after making long slides on the ice. One sliding pleasure car is reported to have kicked three trucks into the river.

Says Union Favors Ohio to Detriment of Kanawha

Kanawha operators, speaking through D. C. Kennedy, secretary of the Kanawha Coal Operators' Association, assert that conditions have been imposed on them by the union which make it much more costly to produce coal than in Ohio mines. As an instance, it is pointed out that in Ohio 70 per cent of the men employed are tonnage workers. In the Kanawha field the percentage is but 54.

More helpers have to be employed in the West Virginia mines, Mr. Kennedy contends, than in the Ohio mines, it being pointed out that in the mines of the latter state car tracks are laid to the opening of rooms, the miners being required to lay the tracks back to the face of the coal, whereas in West Virginia all tracks are laid to the face of the coal for the miners. This necessitates the employment of additional labor. Helpers or assistants are required to be furnished in West Virginia, it is claimed, but not in Ohio. Because of the necessity of employing more labor, Kanawha operators assert that the cost of production is greatly increased and that such an increase in

Germans Get North Dakota Lignite Fields?

It is reported that August Thyssen, of the Mannheim (Germany) firm of Thyssen & Co., has taken options on lignite fields in North Dakota and will engage in the production of briquetted lignite under a new German process. Dr. Hans Holzwarth, chief engineer for the firm, has been in Minneapolis, Minn., after a trip of inspection of the lignite fields, and is said to have taken options on some promising lignite fields. A rotary distillation process, which recovers numerous byproducts and produces a "hema-coke" is to be used. This coke is ground and briquetted with pitch recovered from the raw material. It is asserted that this product can be produced and sold in the Twin Cities at \$8 a ton. It is also possible that machines for the process will be manufactured in this country, possibly in the Twin Cities.

the cost of production constitutes another handicap to reasonable competition with coal mined in Ohio.

A conference has been called for early in January between a committee from the International office of the United Mine Workers and D. C. Kennedy, secretary of the Kanawha Coal Operators Association, with a view to ironing out the existing inequalities.

Bay State Coal Committee Presents Findings

The Joint Special Coal Investigating Committee, appointed by the Massachusetts Legislature to probe the coal business, in a report just released, finds among other things the following:

(1) The Legislature cannot assure a continuous and adequate supply of anthracite.

(2) Adoption of lower-cost fuels, especially bituminous coal, by the public is the way to meet the problems of fuel supply.

(3) There is no justification for the \$16 retail price asked for domestic coal by Boston retailers, as the maximum should be not more than \$15.50.

(4) There should be federal legislation providing for complete publicity with respect to the anthracite industry, this including operators, sales organizations, transportation companies and the miners' union.

(5) The President should be authorized, in case of actual or threatened suspension, to name a special commission of inquiry and conciliation.

(6) The contract between operators and the union should be amended to provide penalties in case of a breach by either party.

(7) Congress should authorize some federal agency to standardize anthracite sizes and quality.

(8) In case of a fuel emergency the Interstate Commerce Commission or some other federal agency should receive power to prevent speculation in coal by jobbers and wholesalers.

(9) The State of Pennsylvania should repeal "the now notorious anthracite tonnage tax."

Rail Coal Consumption Heavy During October

Class 1 railroads of the United States consumed 9,411,000 net tons of coal during October, 1923, as charged to account 394, compared with 8,521,000 tons in the preceding month and 9,281,000 tons in October, 1922, according to a report by the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. During the first ten months of 1923 these roads consumed 91,715,000 tons as compared with 76,159,000 tons in the corresponding period of 1922. The delivered cost per ton in October last was \$3.30 as against \$4.26 in October a year ago.

Consumption of fuel oil during October was 198,760,000 gallons, compared with 175,943,000 in the preceding month, and 154,749,000 gallons in October, 1922.

Oddie Legislation to Provide Minimum Federal Role in Coal Industry

Nevada Senator Discounts Proposals to Fix Prices and Limit Margins — Sees Need of Assistance—Constructive Report of Massachusetts Commission Occasions Surprise

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

In introducing legislation suggested by the report of the Harding Coal Commission, Senator Oddie will not follow exactly the recommendations which the commission put forward. The Nevada Senator, who is chairman of the Committee on Mines and Mining, to which the Coal Commission's report was referred, has not determined finally the exact provisions he will put forward in the legislation that he will introduce. He is much impressed with the intricacy of the problems presented, but he views with particular approval those features of the commission's recommendations which emphasize the need for fostering and developing the coal industry in putting it on a stable basis.

As a man familiar with the problems of actual mining, he is inclined to discount the proposals for regulation, which include price fixing, limitation of margins and the like. He has not committed himself as yet as to just how far he is willing to suggest any extreme measure until other means have had a fair trial. He recognizes that the important thing to be accomplished is to insure the public of a constant and adequate supply of bituminous coal. If that can be accomplished, he believes prices and profits will take care of themselves.

Senator Oddie is thoroughly convinced that the coal industry needs the same sort of careful assistance which he is proposing for the mining industry in general in his bill providing for the establishment of a Department of Mines.

It is evident that the views of Senator Oddie are at variance with those of Representatives Treadway, Luce and Rodgers, and with those of Governor Pinchot.

In connection with the legislation suggested by the New England members of the House of Representatives mentioned, it is pointed out that the report of the Massachusetts commission appointed by the Legislature of that state takes a more constructive position. It does not advocate limitation of margins, fixing of prices, nor other extremes of legislation, although it does advocate publication of essential facts through a central agency with powers to prescribe forms of accounts.

The restraint and good sense which is shown in that report came as something of a surprise to Washington, which has been accustomed to expect rather radical suggestions from New England. The outbursts of certain members of Congress from that section are regarded with much tolerance because it is realized generally that their section

of the country has gone through some very disagreeable experiences.

If the report of the Massachusetts committee correctly interprets the feeling of the people of New England, it would indicate that they believe some federal action is necessary, but that they are not ready to go to the length of putting coal on a public-utility basis.

While the legislation Senator Oddie is drafting is certain to reflect his interest in a Department of Mines, it is known definitely that it will provide for a minimum amount of federal intervention in the conduct of the coal business.

As a step toward obtaining a Department of Mines, a compromise proposal is being considered. It is quite evident that the addition of a Secretary of Mines to the Cabinet can be effected only after a hard fight, which, necessarily, must extend over a considerable period. An important step in that direction, however, would be marked by the simple addition of the two words "and Mines" to the "Department of Commerce," making the official designation of that branch of the executive machine read "Department of Commerce and Mines."

The early transfer of the Bureau of Mines to the Department of Commerce seems probable. The President is committed to a policy of strengthening the Bureau of Mines. Arrangements already are being made for increased activities on the part of that bureau. If while these changes are being made, the designation of the department can be changed as mentioned it will give increased recognition to the mining industry by the federal government and will mark great progress toward a separate department that will deal with mining matters only.

Governor Smith Says New York Can't Handle Coal Situation

In his address to the Legislature on Jan. 2, Governor Smith referred to coal in the following words:

"This time a year ago the state was suffering from a shortage of coal due to a prolonged strike at the mines and we were obliged to invoke the extraordinary police powers of the state for the protection of our people. While there is no shortage apparent at this time the price of coal has been increased to meet settlements made because of another strike threatened during the month of September.

"In my opinion the coal problem is one we cannot handle in this state ef-

fectively. No coal is mined in the State of New York and costs of production, taxation by the state where it is mined, and the rates fixed by the Interstate Commerce Commission are all entirely outside of our control. We can only turn the searchlight of public opinion on those who would take advantage of the situation to profiteer. We have done this by creating the fair-price coal commissions in the various cities where it has been certified to me by the chief executive of the municipality that conditions warrant it.

"I call this to your attention at this time in order that appropriate committees of your honorable bodies may have the matter under consideration so that if an emergency should arise through shortage or failure of adequate transportation, the state may be ready at a moment's notice to take such action under our police power as might be required for the preservation of the public health."

Says Searles Is Preparing "Usual Alibi"

Walter H. Cunningham, secretary of the West Virginia Coal Association, commenting on the statement attributed to Ellis Searles, editor of the *United Mine Workers Journal*, that the non-union operators are trying to bring about a strike in union fields in order to make unholy profits, said: "Searles has adopted the same publicity tactics that marked the preliminary phases of the union miners' walkout in 1922. It would appear it has become the fixed policy of union officers to provide in advance an alibi and thus maneuver into a position where they can take advantage of their own misdeeds.

"The charge that non-union operators of southern West Virginia are attempting to force a suspension of work in the union fields is as ridiculous as his charge that operators 'made millions of dollars in unholy profits in the strike of 1922.' Operators in the non-union districts have no more control over events in the union coal fields than they have over the actions of the officers of the United Mine Workers of America."

CHARLES H. DORRANCE HAS RESIGNED his position as vice president in charge of operations of the Hudson Coal Co., with offices at Scranton, Pa., because of ill health and need of rest. Mr. Dorrance's duties will be taken over by A. M. Fine, who will also continue as vice president in charge of the auditing department.

BIDS FOR FURNISHING and delivering 10,000 gross tons of bituminous coal for navy vessels will be received by the U. S. Navy Department at Washington on Jan. 16. The coal is to be delivered as needed alongside ships New York harbor or at the Brooklyn Navy Yard and must conform to the following analysis: Volatile, 23 per cent maximum; ash, 7 per cent maximum; sulphur, 1.5 per cent maximum, and B.t.u., 14,700 minimum.

Davis Invited to Address Union Miners' Convention

James J. Davis, Secretary of Labor of the United States, has been invited to make an address the first day of the annual convention of the United Mine Workers in Indianapolis, Jan. 22. About 1,800 delegates are expected. Officials of the union say it is impossible to say at the present time just what the wage demands of the miners will be, that question being entirely in the hands of the wage-scale committee and the body as a whole, but they say that no cut in wages will be countenanced.

Last year more than 600 resolutions were submitted on wage and working conditions alone and officials expect as many this year. A change in the method of allotting delegates will reduce the number at the convention this year by about 400. More than 2,200 delegates were present at the last convention. The same number of votes will be in evidence, however, a delegate being empowered to declare all the votes he represents.

Buyers' Year Ahead Is Opinion Of Statisticians

The real purpose of the American Statistical Association meeting in Washington recently was to discuss forecasting in business and the prospects of 1924. This gathering, which included many of the brightest minds engaged in statistical work, reached the conclusion that 1924 promises to be very much like 1911. An analysis of the situation at the close of 1910 shows that much the same influences were at work at the close of 1923.

On that and other assumptions, it seems to have been the consensus of opinion that 1924 will follow a course midway between prosperity and depression. There will be little unemployment. Wage schedules will undergo little change. Price fluctuations will be small. Business will be cautious but not dull. Competition will be keen. The volume of business will be less than in 1923 but will be greater than that of 1922. It will be a buyers' year, rather than a sellers' year.

The thought of the meeting with regard to coal seems to have been that it will be a year of serious competition, one in which the public may expect an ample supply of coal at reasonable prices provided it does its part in spreading purchases evenly enough throughout the twelve months to prevent a peak in the fall, which the railroads would not be able to handle.

R. M. RANDALL, of Saginaw, Mich., general manager of mines for the Consolidated Coal Co. of Michigan, died Jan. 1. For years he had been the operating head of the company's four Michigan mines, producing nearly half a million tons of coal annually. He represented the company, and usually the State of Michigan, in all labor negotiations and was a vice-president of the National Coal Association.

International Mine-Rescue Meet at Huntington

Huntington, W. Va., has been selected by the U. S. Bureau of Mines as the place for holding this year's International First-Aid and Mine-Rescue Meet. The meet probably will be held in September.

Winslow to Draft Coolidge's Coal Plan for House

Legislation representing President Coolidge's views on coal and transportation problems are to be placed before the House soon by Representative Winslow, of Massachusetts, chairman of the House Committee on Interstate Commerce, before which such matters come. At a conference Jan. 3 the President clarified the administration policies as set forth in his message to Congress. As a result of the conference Representative Winslow intimated that he would draft bills embodying the President's ideas for presentation to his committee this week.

Mr. Winslow said that the President advocated the establishment of a commission empowered to deal with future emergencies in the coal industry, the bringing about of greater unity in the ownership of coal mines and the formation of common coal-selling agencies for limited districts.

The administration legislation also will cover consolidation of the railroads, both regional and route, providing federal machinery for the stimulation of such consolidation and will propose a reorganization of freight rates.

Bituminous-Wage Parley Feb. 11 in Florida

Union representatives and operators of Ohio, Indiana, Illinois and probably western Pennsylvania will meet at Jacksonville, Fla., Feb. 11 to negotiate a new wage agreement for bituminous-coal miners, to become effective April 1. This was agreed upon at a meeting of representatives of the miners and operators of Ohio, Indiana and Illinois held in Cleveland, Ohio, Jan. 4.

Western Pennsylvania was not represented at the Cleveland meeting but in the call to be issued for the Jacksonville conference the miners and operators of that state will be included. It was specified at a joint conference in New York last January that in case a wage scale meeting is called this year all four states be included, despite the fact that the western Pennsylvania men are not signatories to the present wage agreement, which expires March 31. If western Pennsylvania declines the invitation, a three-state conference will be held.

Treadway Presents Coal Bill In Trust-Busting Speech

Something of the temper of the House of Representatives may be judged from the fact that it burst into applause when Representative Treadway, of Massachusetts, in the course of an old-fashioned trust-busting speech, declared that he agrees heartily with Governor Pinchot in his expression that the company operations in Pennsylvania constitute a "hard-boiled monopoly, whose prime interest in the public is that it shall consume their coal at their price." There also was vigorous applause for his demand that the anthracite companies be required to give publicity to their accounts. He did not spare the mine workers in his excoriation of the anthracite industry. He condemned the state license system and the limitation placed upon output.

Representative Treadway reviewed such portions of the Coal Commission's report as supported the bill which he has introduced. He was not particularly complimentary to the Coal Commission, but declined to concur in an expression by Representative Blanton, of Texas, that \$600,000 had been spent on a useless commission. He contended that the federal government is the only agency which can grapple with the situation with any hope of success. He expressed himself as being against government ownership, but feared the public demand eventually will be such as to force it. Mr. Blanton again interrupted to say that government ownership would mean a cost at the mine of \$25 a ton.

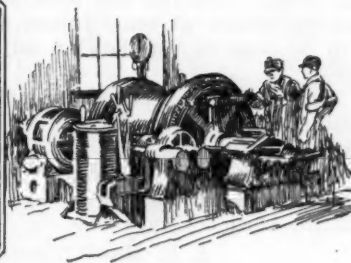
Corona Co. Files Two Appeal Writs; One Dismissed

The writ filed by the Corona Coal Co. of Alabama, to appeal from a decision of the Court of Claims in a suit against the U. S. Railroad Administration was dismissed Jan. 7 by the U. S. Supreme Court on the ground that the company had also filed suit in a federal district court and that it could not proceed by both methods. The company had a contract to supply coal to several railroads. When the Railroad Administration took over the carriers it attempted to enforce the contracts, but this was denied. The Fuel Administration then requisitioned the coal. The Railroad Administration paid the contract price for the coal it used. As this price was lower than the price declared fair by the Fuel Administration, the Corona company sought to collect the difference.

THE INTERSTATE COMMERCE COMMISSION has called a hearing in Minneapolis for Jan. 17 in connection with the protest against withdrawing the joint-all-rail rate on anthracite. If the joint rate is withdrawn and the sum of the locals applied, it will cause an increase in freight of \$1.66.



Practical Pointers For Electrical And Mechanical Men



Explanation of Fan in Electrical Terms; Increasing Efficiency with New Drive

A shunt-wound generator driven at a certain speed produces a certain pressure or voltage, which as long as the speed remains constant will be reduced only by the resistance to the current flowing through the generator winding itself. The amount of this current will depend on the resistance of the external circuit or path connected to the generator, the resistance of this path being proportional to its length and inversely proportional to its cross-section. Similarly, the mine ventilating fan driven at a certain speed produces a certain pressure or water gage which as long as the speed remains constant will be reduced only by the friction of the air flowing through the fan itself, and the amount or volume of this current of air will depend on the resistance of the external path connected to the fan, the resistance of this path being proportional to its length and inversely proportional to its cross-section.

The water gage as generally read, as being the friction drop in the mine, corresponds to the drop in voltage in the electrical circuit. The greater distance the current of electricity or air is to be carried, the greater the pressure that is necessary to force it through the circuit whether it be an electrical conductor or a mine gangway. To produce greater pressure either the armature or fan must be run at a higher velocity or the diameter must be greater to produce a higher peripheral speed. If the electric current or current of air is to be greater than a greater path area is necessary both internally and externally if the flow is to be produced efficiently—that is, the generator must have a larger area of conductor, whether it be obtained by one large conductor or several smaller

ones in parallel, and the fan must have a larger area whether it be widened out or have multiple inlets, to give a larger air passageway. The method of obtaining greater area of section to permit the flow is similar in the external path—that is, one large path or several smaller ones in parallel.

If a generator were purchased to produce 250 volts and 1,000 amperes, it would not be expected to produce either 500 volts or 2,000 amperes, even disregarding the efficiency; in fact, the generator, if not protected by fuse or circuit-breaker, probably would burn up, while the fan, if driven by a motor or engine of sufficient power, would continue to operate, but inefficiently.

If the generator is operating with a heavy load and the pressure is low at the end of the line, tests are made for

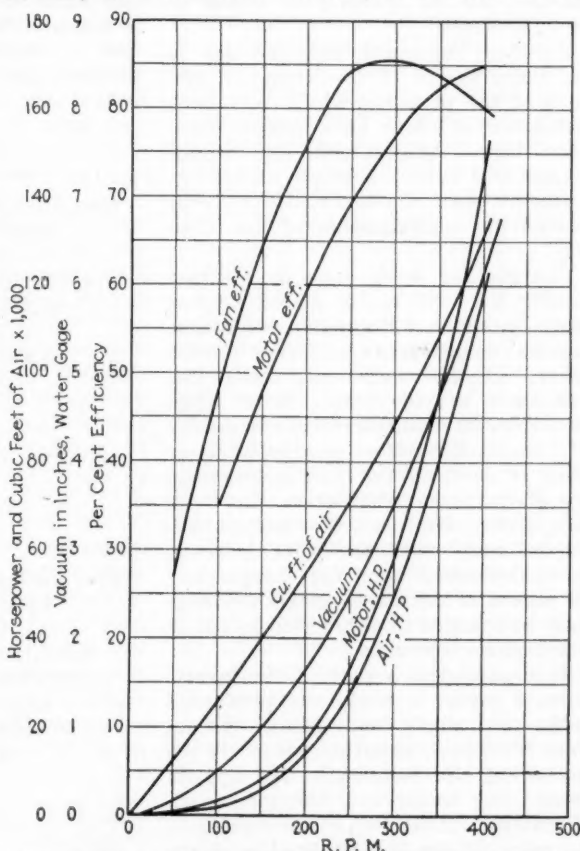
short-circuits, the area of conductors is checked and if small is increased, and if conditions are such that the generator is still overloaded, additional capacity is installed; but in the case of the fan, in many cases it is speeded up and made to run inefficiently and given no further consideration.

In the case of the generator, the current forced out by the pressure must return to the generator, and as no efficient path has been provided by nature we are forced to provide a path of sufficient area. By sinking a shaft at the far end of the mine we are enabled to use a path of infinite area for the fan return.

Because in many cases the power cost of pumping and ventilation is 60 per cent of the total power cost, it appears that greater care should be taken to make the fan deliver its air efficiently. Short-circuits in the air course and restricted air courses will show only in the power bill, unless accurate instruments are installed and readings carefully noted.

The following are tests made on a number of fans scattered throughout the coal region: Fan 6 ft. x 3 ft. 6 in. installed on shaft, delivering 105,000 cu.ft. of air per minute; water gage, 2.9 in.; input to motor, 180 hp.; in the air, 48 hp.; efficiency of installation, 26½ per cent. Fan 6 ft. x 3 ft. 6 in. installed on shaft, delivering 66,300 cu.ft. of air per minute; water gage, 3.6 in. input to motor, 142 hp.; in the air, 37.6 hp.; efficiency of installation, 26.4 per cent. Fan 6 ft. x 3 ft. installed on drift, delivering 60,000 cu.ft. of air per minute; water gage, 0.5 in.; input to motor, 9 hp.; in the air, 4.7 hp.; efficiency of installation, 52.2 per cent. Fan 4 ft. x 2 ft. 6 in. installed on shaft improperly located, delivering 45,000 cu.ft. of air; water gage, 2.5 in.; input to motor, 42.9 hp.; in the air, 17.7 hp.; efficiency over all, 41.3 per cent.

For one of our new fans 90,000 cu.ft. of air per minute was necessary, so a new shaft was sunk at the proper location and a 6 ft. x 3 ft. Jeffrey fan installed. As the fan could be run at reduced speed at night and on idle days, a General Electric variable speed brush-shifting motor was connected to the fan. This motor was arranged to run from 100 to 243 r.p.m. with windings in star and from 243 to 450 r.p.m. with windings in delta, the motor being direct-connected to the fan. The curves show that the 90,000 cu.ft. was obtained with an input to the motor of 60 hp., and if this had to be obtained with the old



OPERATING CHARACTERISTIC CURVES OF FAN AND MOTOR

Much of the mine power bill is due to the fan; therefore any saving in efficiency in the fan and motor drive is highly desirable and soon pays for itself. These curves cover a modern fan and a brush-shifting motor.

installation it would have required 350 hp. input. This fan was installed in a position where at some future date it will be used to ventilate an adjoining mine.

It would seem that the ventilating system of the mine should receive the same careful study as the electrical system; otherwise it will be found that in many cases the flow will be sufficient but the efficiency very poor.

J. F. MACWILLIAMS,
Electrical Engineer.

Pennsylvania Coal & Coke Corp.,
Cresson, Pa.

Almost a Serious Accident on Ungrounded Machine

Several days ago I was sent to a coal mine in one of the Southern states to locate and repair some trouble on a motor-generator set. The generator was a 275-volt machine and the motor operated at 2,200 volts. The details of the trouble were not given me, so I had no idea what the trouble was. After reaching the substation, which was about 2,000 feet underground and in an extraordinarily dry place for a coal mine, I began my investigation.

The substation equipment was enclosed with a wire fence and the superintendent reached over and touched the machine which was still running, explaining to me at the same time that it shocked anyone who touched it. Several of the other men who were to help repair the machine touched it also. Seeing that they were not seriously shocked I touched it with the back of my left hand.

My conclusion was that the d.-c., or low-voltage, side of the machine was grounded slightly. But when the machine was shut down there was no ground found on the d.-c. end. Accordingly the motor winding was tested and showed a dead ground. We had all been flirting with death, handling 2,200 volts while standing on the ground. I looked around the machine for a ground wire but it had not been installed, nor was there a ground to the switch framework. I cleared the ground on the motor by cutting out a defective coil. Then I reported the lack of a ground wire and its function to the superintendent. He promised to see that the machine was properly grounded the next day.

If any of the attendants of that substation had been killed or injured I have no doubt that if the case were taken to court it would return a verdict of "criminal negligence" on the part of the company operating the station ungrounded.

The importance of grounding apparatus which is classed as high-potential electrical machinery cannot be overestimated, especially around a mine, where the earth generally is damp. To leave machinery of this class ungrounded is to break both the mining laws and the laws of the Underwriters. Following is a list of the sizes of wire

to use for grounding purposes as specified by the Board of Fire Underwriters:

SIZES OF WIRE REQUIRED FOR GROUNDING

(As listed by National Board of Fire Underwriters Under Rule 15A Section m)

Capacity of Nearest Cutout Protecting the Equipment	Size of Ground Conductor
0 to 100 amp.	No. 10 B & S gage
101 to 200 amp.	No. 6 B & S gage
201 to 500 amp.	No. 4 B & S gage
500 and above	No. 2 B & S gage

The above is for copper wire only. The place of connection should be in plain sight. A piece of trolley wire is all right for a ground wire.

GRADY H. EMERSON,
Birmingham, Ala. Electrician.

Charges to Capital and Maintenance Accounts

One thing that the Coal Commission noticed in its survey of the coal industry was the lack of definite information of the capital invested at the coal mines. Only the larger companies have any system whatever of knowing just how much capital investment they have in their property and what the maintenance costs on the plant are.

It certainly is not proper to charge all the expenditures for equipment and changes to the mine plant to the capital account. Most mining expenditures may be charged either to capital or to maintenance, but some charges require considerable thought before the proper amount can be charged to either of these accounts.

Another important consideration is the charging off of the value of portions of the property which have been abandoned or which have become obsolete. Unless this is done the capital charge will reflect a much higher investment than could actually be considered the capitalization of the property.

Charges for work done on contract usually are very easily placed against capital account. Maintenance charges, such as are ordinarily necessary for the upkeep of the equipment, easily fall into their proper class. Some large companies have authorization forms for all new work. Before any material or labor is done on the job, instructions are given as to what class the work falls under. However, the charges cannot be made until the work is done, since, depending upon the charges and the extent of the work, certain amounts must be charged to either the capital or maintenance accounts.

To decapitalize a part of the investment, a report is made and forwarded to the controller's department. Here a trace is made to ascertain positively the amount of the decapitalization and its value. Due to the ever changing costs of materials it is often a question as to the value of the decapitalized property or material. Nevertheless, an accounting department following up this work usually would have little difficulty in writing off the proper value.

Sealing a Centrifugal Pump Against Air Leaks

Everyone knows the importance of preventing air entering a centrifugal pump. Once air enters the pump it causes several difficulties; most important, however, is the fact that it cuts down the capacity and makes the pump rattle. Depending upon the design of a pump, air leaks happen at joints and pump connections and through the stuffing boxes. Air leaks in pipe connections are not always obvious, while leaks at the stuffing boxes are more easily traced.

In horizontally split pumps the connection between the upper and lower parts of the casing often are neglected and cause air leaks which usually are not easy to find. In taking the pump apart the gasket between the two parts frequently is broken, thus causing ridges and leaks.

To avoid the breaking of this gasket and thus to keep the joints free from leaks, our company has made a practice of using a heavy paper gasket and thoroughly shellacking it to the lower half of the casing. When this shellac has dried the upper surface of the gasket is thoroughly soaked with a lubricating oil. The upper half of the casing is then placed on top of the oiled surface and the two parts are tightly bolted together. The oil tends to some extent to soften the paper and at the same time fills in the pores or slight imperfections in the castings. In this way a very tight joint is made and when the upper half of the casting is removed from the pump, the separation is made without damaging the gasket. By proper care the same gasket can be used several times and yet never be broken.

MINE MECHANIC.

One kilowatt equals:

1,000	watts.
1.3410	horsepower.
2,655,180	ft.-lb. per hour.
44,253	ft.-lb. per minute.
737.56	ft.-lb. per second.
3,415	heat units per hour.
56.92	heat units per min.
0.9846	heat units per second.
0.234	lb. carbon oxidized per hour.
3.52	lb. water evaporated per hour from and at 212 deg. F.

One kw.-hr. equals:

1,000	watt-hours.
1.341	horsepower hours.
2,655,180	ft.-lb.
3,600,000	joules.
3,415	heat units.
367,100	kilogram meters.
0.234	lb. carbon oxidized with perfect efficiency.
3.52	lb. water evaporated from and at 212 deg. F.
22.77	lb. of water raised from 62 deg. to 212 deg. F.



Problems In Underground Management



Would Ventilate Mine Fire Area With Inert Gas

Why Stopping Intake Is Inadvisable—Small Fire Area If Shut In May Explode—Can Extinguish Crop Fires Only If Dead Air Is Driven in Fast Enough to Keep Surface Air Out

BY JOSEPH J. WALSH

Secretary of Mines, State of Pennsylvania, Harrisburg, Pa.

When sealing a mine fire in a gaseous mine, the question whether the return or the intake seal should be erected first frequently arises. Various answers are given to this question, depending upon conditions in the mine.

Under any condition it is an extremely dangerous practice in a gaseous mine to erect the intake seal first. This is particularly true if an exhaust fan is used, for the reason that when the intake seal is erected first, the gases generated by the fire are free to move to the fan, and any firedamp that may accumulate in the air course leading to the fire will move, of course, in that direction and become ignited.

On the other hand, if the return stopping is erected first, the gases generated by the fire will spread in all directions, forming a zone of inert gases around the fire, thus creating a condition that will not support the combustion of methane or firedamp.

It is a hazardous undertaking to seal a small fire in a gaseous mine, because it cannot generate sufficient inert gases to create a zone sufficiently reduced in oxygen to prevent the explosion of firedamp. If a fire is known to be small and must be extinguished by the sealing method, fresh air should be applied, if necessary, until the fire extends across the face of one chamber, at least. The size of a mine fire can be determined readily even though it is inaccessible and cannot be seen.

The conditions, however, surrounding the crop fires render their sealing of little value. It is practically impossible to exclude fresh air from these fires because of the broken strata and the closeness of the fire to the surface.

For extinguishing fires of this nature I propose the inert-gas method, that is ventilating (if we may use the term)

the affected area with a gas consisting chiefly of nitrogen and carbon dioxide, together with small percentages of carbon monoxide and oxygen, the latter being in such small proportion that they will not support combustion.

In order that this system may be used successfully it is necessary that the gas be forced into the mine with a force sufficient to create a pressure within the fire area greater than the pressure of the atmosphere surrounding this area. When this is done, every opening or crevice leading from the surface into the fire section will be converted into an outlet for the inert gas, thus assuring the exclusion of fresh air. In other words, all the openings through which fresh air might enter the mine will be sealed by the inert gas.

This gas would be generated simply by burning the oxygen out of the air. The products of combustion then would be passed through a cooling system, thence to a fan, by means of which they would be forced into the mine.

ESTIMATION OF PLANT NEEDED

The size of the plant, of course, would depend on the volume of gas required each minute. For example, assuming that a plant capable of producing 10,000 cu.ft. of gas per minute is required, four furnaces with grates 7 ft. wide and 6 ft. deep would be necessary, these being arranged in batteries of two furnaces to the battery.

The grates should be of the dumping type, as the low carbon dioxide and high oxygen prevailing during fire cleaning make it essential that these periods be curtailed as much as possible, and this can best be attained by the use of dumping grates. The furnaces should be provided with a blast equipment capable of supplying 10,000 cu.ft. of air at a suitable water gage, and with appropriate dampers, so that the furnace may be isolated at will.

The hot gases from each furnace will enter a firebrick-lined header, from which it will be distributed to six cooling flues about 35 ft. long and 18 in.

in diameter. These cooling flues will be immersed for 30 ft. of their length in a tank of cooling water. The partly cooled gases will be gathered at the far end of these cooling flues and conducted through an airway to the cooling tower.

The purpose of these flues is to give the gases a preliminary cooling so that the latter may be handled without difficulty. The inert gas leaving the furnaces will be at a temperature of about 2,200 deg. F. and these flues are designed to drop this temperature to about 600 to 700 deg. F. This partly cooled inert gas will enter the base of a cooling tower 30 ft. in height and 16 ft. in diameter, constructed of hollow tile. In this cooling tower its velocity would be reduced to about 50 ft. a minute.

GAS COOLED TO 80 DEG.

Five feet from the top of this tower sprays would be provided that would discharge 400 gallons of water per minute at a pressure of 7½ lb. to the square inch into the ascending hot gas, dropping its temperature to about 80 deg. F. The cooled gas would leave the tower at its top and be carried by a downcast to its base, where a fan capable of producing 10,000 cu.ft. of air per minute at a 3-in. water gage would deliver it for distribution to the mine workings. The hot water leaving this cooling tower might be used to supply the preliminary cooling tank, and it might be advantageous to locate the tower at such a height that this water would flow by gravity to the cooling tank.

If we assume that 1 sq.ft. of fire grate will consume 20 lb. of coal each hour, the area of a fire grate that will consume sufficient coal to produce 10,000 cu.ft. of an inert gas per minute may be found as follows:

Admitting a 30-per cent excess air supply to the furnace 1 sq.ft. of fire grate consuming 20 lb. of coal each hour would produce each minute:

$$\frac{16.6 \times 20}{60} = 5.5 \text{ lb.}$$

or 72 cu.ft. of gas. To produce 10,000 cu. ft. of gas each minute a grate area will be required of

$$\frac{10,000}{72} \text{ or about } 140 \text{ sq.ft.}$$

The coal used in a plant of this size, after making an allowance of 30 per cent for the coal wasted, would be about 4,000 lb. per hour.

Article entitled "Mine Fires and Some Methods for Extinguishing Them," delivered before the Coal Mining Institute of America, Dec. 20, 1923, at its Pittsburgh meeting. A description of this method, without many details which Mr. Walsh has since added, was contained in an article which appeared in *Coal Age*, Feb. 23, 1922, pp. 328 and 329.

Discussion

Operators Should Formulate Better Laws That Coal Mining May Be Made Safe

A member of the American Association of Labor Legislation in giving his views has found some who do not agree with him on additional legislation as a means of enforcing safety in mines, especially where he favors abolishing the use of black powder from mines, and again where he advocates placing police power in the U. S. Bureau of Mines. One writer in answer says that there are now few mines where permissibles should be used that are not using them and says further that resistance doesn't come from the operator so much as from the miner and that safety is to be obtained through education rather than legislation.

One can readily agree that education is the foundation of safety, for, broadly speaking, education is the foundation of all things, but I believe we will all agree that the education of the individual is a slow process, so slow in fact that little can be accomplished. For this reason it would be well to consider educating legislators rather than individuals and through wise legislation enforcing safety on those who oppose it. This would be preferable to placing police power in the Bureau of Mines. The operators in mining states should meet the legislators at every session and discuss what legislation should be passed to lessen the dangers of mining.

No doubt there are legislators in some mining states who are familiar with mining needs, but the number in most of these probably is small. When the draft of a mining law is presented it usually is held over for further discussion, which means that the legislators do not know how to act on it, and in consequence the draft is never enacted into law. Going back over my own experience, I can recall few instances where anybody took the initiative in revolutionizing any phase of mining so as to enhance its safety. I can recall, on the other hand, that almost every important step in safety has been enforced through legislation.

The attitude that the average individual takes is, Does the law say I must do this? or Can the law compel me to install this or that safety equipment or practice? The truth is, most of our accomplishments in safety have resulted from remedial legislation, even though some mining men have taken the initiative and gone far ahead of all requirements of the law to make their mines safe and satisfactory to work in.

Education must continue—it would be a sad world without it—but nevertheless we will always have many individuals who will not consent to be edu-

cated into safety and can be reached only through the strong arm of the law.
Pineville, Ky. GEORGE EDWARDS.

Workman's Share in Britain Exceeds Even 85 per Cent

As Paul Wooton has correctly stated, the original arrangement in the National Wage Agreement of Great Britain was that the net proceeds obtained by the coal operators should be divided between the employees and employers on the basis of 83 per cent and 17 per cent, but it actually works out 85 per cent to 15 per cent, as a number of items of necessary expense should be included, for in drawing up the agreement no allowance was made to the operator for such expenses as rent allowances and free or cheap coal to the workmen.

I have taken as my authority the annual report of the Secretary for Mines for 1922, and as a matter of fact practically all the data given in my paper were taken from pages 6-8 of that report, as I have stated in my article. The Secretary says in effect:

The gross proceeds left after all charges are paid other than wages and wages costs are commonly known as the net proceeds, and these are available for wages and profits, "and shall be shared in an agreed proportion which works out at about 85 to 15 per cent."

As a matter of fact, in 1922, on account of some of the districts being on the "minimum" for most of the year, the average for all the districts when worked out proved to be on the basis of 92½ per cent to 7½ per cent.

Pittsburgh, Pa. JOHN T. RYAN.

Sprayed Concrete at Bruceton

In the test explosion at the Bruceton Mine the U. S. Bureau of Mines sprinkled 600 ft. of entry with one pound of coal dust from the West Kentucky No. 9 seam per lineal foot of entry and by a blown-out shot of 4 lb. of F. F. F. black powder produced an explosion the flame of which extended

300 ft. beyond the point where the coal dust was sprinkled. Gunite had been placed on the inner portion of this entry on the roof and ribs and within a few feet of the face. On examination the coating was found to be everywhere intact, despite the severe test thus incidentally made on it.

Large Automatic Drop-Bottom Cars in Effective Service

In your Oct. 18 issue, p. 594, was an article in which reference was made to a statement of Frank Haas as follows:

"As regards bottom-dump cars, he believed that they could hardly be constructed safely in excess of 1½ or 2 tons capacity."

This is a rather serious criticism of the automatic drop-bottom car. I feel that it is my duty and yours to give publicity to the facts. Let me say, at least for the Sanford-Day Iron Works, that we have never had complaint in regard to the strength of this type of car except in regard to some bumper castings of defective steel. Furthermore, no weakness has since developed. One car was loaded with 11,200 lb. of pig iron with no noticeable deflection of the bottom doors.

Now, as to actual practice: After about seven years of continuous service the First Creek Coal Co., of Blue Diamond, Ky., which installed the first fifty cars of this type which we made, wrote us that their cars carried on an average 2½ tons of coal and that they sometimes have loaded 6 tons of slate upon them.

The 10-ton incline monitor of another coal company broke down and the management arranged to build up the sides of two automatic drop-bottom cars (with 2½-in. round axles) until they held between 5 and 6 tons of coal each. These cars gave complete satisfaction until new monitors were built.

The accompanying table gives an incomplete list of corporations using automatic drop-bottom cars with the average loads carried by the cars.

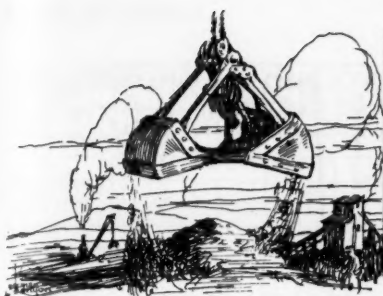
This type of car can be built to carry satisfactorily 6 to 10 tons. As you will note, the average load of the U. S. Gypsum Co. is 6.75 tons. In fact cars recently have been designed with a capacity exceeding 200 cu.ft., level full.

Despite what Mr. Haas has said, no objection has been made to the strength of the car even when it is loaded in excess of 2 tons. The cars are used not only for coal but for limestone, iron pyrites and silver ore, and they are built to support a load that only a 3-in. axle will carry safely.

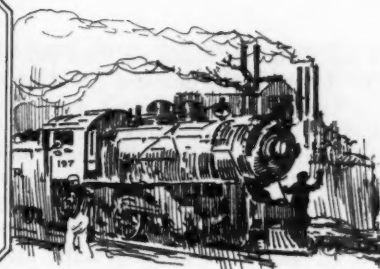
LOADS CARRIED BY DROP-BOTTOM CARS

Company	Post Office	Average Loads in Net Tons	Maximum Loads in Net Tons
Glogora Coal Co.	Stickney, W. Va.	3.00	4.00
Winona Coal Co.	Birmingham, Ala.	5.00	6.00
U. S. Gypsum Co.	Oakfield, N. Y.	6.75	7.42
Bear Canon Coal Co.	Trinidad, Colo.	3.00	3.80
Hardy Coal Co.	Panther, W. Va.	3.60	5.00
Helena-Straven Coal Co.	Straven, Ala.	2.60	3.00
Hanover-Bessemer Iron & Copper Co.	Fierro, N. M.	5.00	6.00
Silver Dyke Mining Co.	Niehart, Mont.	3.70	4.03

List as originally received contained 22 items.



Production And the Market



Descent of Wintry Blast Stirs Coal Markets; Prices Are Not Affected to Marked Extent

A sudden drop in temperatures over the greater part of the country last week created a stir in the coal market, but failed to affect prices materially. Some industrial consumers who had delayed buying because of the inventory period were forced into the market, while demand for domestic coals took a sudden spurt.

Production of soft coal during 1923 was 545,300,000 net tons, according to the preliminary estimate of the Geological Survey. This was an increase of 123,032,000 tons over the previous year's output, and has been exceeded only by three years, 1920, 1918 and 1917. Output during the week ended Dec. 29 dropped to 6,684,000 net tons, the lowest figure for any week during the last year, and a decrease of 3,859,000 tons when compared with the previous week's production. The loss in output was due to the holiday as well as the stoppage of work the day before and the day after. Production, however, during the last three days of the week recovered to about the previous week's level.

Price Index Advances

Coal Age Index as of Jan. 7 registers 182, an increase of three points, when compared with the previous week, with an average price of \$2.20. There were increases in southern Illinois, Mount Olive, Springfield, Standard and Kanawha and slight decreases in eastern and western Kentucky and Pocahontas districts.

The Western markets felt the effects of the lower temperatures which spread over most of the country. There was a lively jump in demand, but prices showed comparatively little change. Retail dealers were soon cleaned out of supplies and shippers were called upon to ship anything they had. Mines operating on part time were soon operating to capacity. In Ohio there was an active demand for domestic coals and similar conditions were reported at Pittsburgh. There was no improvement noted in the steam-coal situation in New England

and buyers continue to show the same lack of interest in the soft-coal situation as during the past several weeks. Trade along the Atlantic seaboard continues dull.

Hard-coal production took a heavy drop during the last week of the year, declining 754,000 net tons to 1,236,000 tons, while preliminary reports indicate an output of about 95,000,000 net tons for the year 1923, a decrease of about 3,000,000 tons when compared with 1918, but about 74 per cent more than 1922.

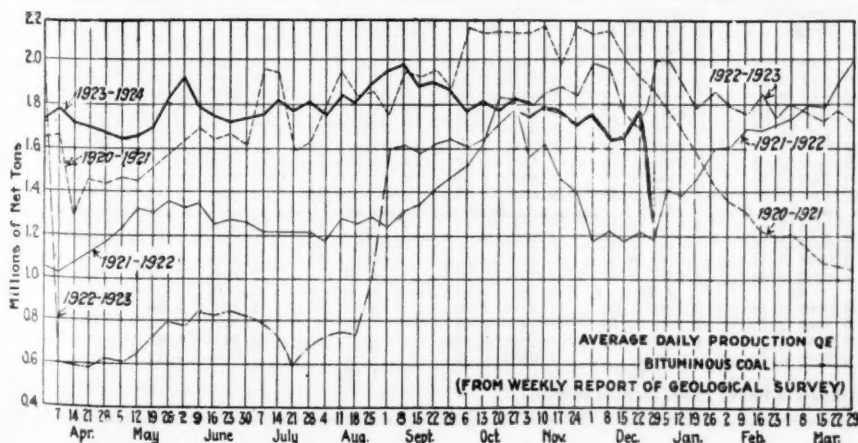
Quotations for independent domestic coals continue to go downward, accompanied by less demand. All sizes are easier and retail dealers in most parts of the country are in good shape to meet any immediate requirements. Pea coal continues easy and can frequently be gotten below company prices.

Soft coal dumped at the lower Lake Erie ports for Lake shipment during the 1923 season amounted to 31,446,823 net tons up to Dec. 30, an increase of 12,095,500 tons over 1922 and 8,275,374 tons over 1921.

The export market was quiet. Some inquiries are being received but comparatively little business was reported as closed. Dumpings at Baltimore during December amounted to 21,030 tons of cargo coal and 4,697 tons of coke, as compared with 59,349 tons of cargo coal and 4,050 tons of coke in the previous month. Dumpings for all accounts at Hampton Roads during the week ended Jan. 3 were 265,413 net tons, as compared with 357,110 tons the week previous.

Joy Reigns in Middle West

There is much happiness and activity in the Midwest coal trade at last. Winter came with a vengeance. At the end of the week the mercury had dropped repeatedly far below zero throughout the Chicago region and the Northwest trade territory. Retailers with small stocks on hand quickly emptied their yards and shippers shipped everything available. Mine tracks have been burdened with "no bills"



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Dec. 15 (a).....	10,667,000	9,938,000
Dec. 22 (b).....	10,138,000	10,543,000
Dec. 29 (a).....	10,171,000	6,684,000
Daily average.....	2,034,000	1,337,000
Calendar year.....	422,268,000	545,300,000
Daily av. cal. year.....	1,380,000	1,178,000

ANTHRACITE

Dec. 15.....	2,237,000	2,013,000
Dec. 22.....	2,065,000	1,990,000
Dec. 29.....	1,588,000	1,236,000
Calendar year.....	54,683,000	95,197,000

COKE

Dec. 22 (b).....	281,000	256,000
Dec. 29 (a).....	260,000	221,000
Calendar year.....	8,033,000	17,919,000

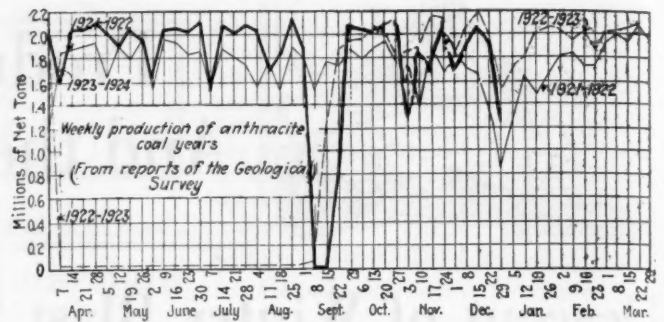
(a) Subject to revision. (b) Revised from last report.

in all domestic sizes, so that producers were ready for the first burst of the demand. Not many changes of price were felt by the end of the week, except some increases in screenings, but they are expected.

In Illinois and Indiana every mine not completely closed up for the winter, was in nearly full-time operation by Friday. However, there are a great many mines in all Illinois and Indiana which are not expected to resume unless the winter is abnormally cold. The extreme cold had a retarding effect on coal, even though no snowstorms accompanied it. Friday and Saturday the coal railroads reported their motive power to be reduced about 40 per cent in efficiency. Extreme cold also kept a good many miners at home, operators reported. On Friday and Saturday wire trouble developed all through Illinois and Indiana, so that many a mine was temporarily cut off from headquarters.

St. Louis Trade Is Lively

Cold weather brought business back to its normal stand. The demand is for the middle and cheaper grades principally, with some high grade moving and occasionally a report of anthracite and a little smokeless and a better



volume of coke. Local carload is quiet, but the demand is strong enough to keep the screenings market safe. Country steam is slow, excepting demand for nut from the Northwestern market and some movement of screenings to Chicago.

The Kentucky coal trade is feeling more optimistic, especially as the new year came in with the first seasonable weather of the winter. Over the holiday period production slumped a little, while many industrial consumers got closer

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Jan. 8 1923	Dec. 24 1923	Dec. 31 1923	Jan. 7 1924†
Smokeless lump	Columbus	\$7.25	\$3.35	\$3.35	\$3.15@	\$3.50
Smokeless mine run	Columbus	6.60	1.85	1.85	1.75@	2.00
Smokeless screenings	Columbus	5.85	1.25	1.25	1.20@	1.35
Smokeless lump	Chicago	7.75	3.50	3.50	3.00@	3.25
Smokeless mine run	Chicago	6.35	2.10	2.10	2.00@	2.25
Smokeless lump	Cincinnati	7.50	3.10	3.10	3.00	
Smokeless mine run	Cincinnati	6.25	2.00	2.10	2.00	
Smokeless screenings	Cincinnati	6.25	1.75	1.75	1.50@	2.00
*Smokeless mine run	Boston	8.35	4.45	4.65	4.60@	4.75
Clearfield mine run	Boston	5.10	1.80	1.85	1.50@	2.25
Cambria mine run	Boston	5.60	2.35	2.50	2.25@	2.75
Somersat mine run	Boston	5.35	2.10	2.10	1.75@	2.50
Pool 1 (Navy Standard)	New York	6.35	3.00	3.00	2.75@	3.25
Pool 1 (Navy Standard)	Philadelphia	6.00	2.95	3.00	2.75@	3.25
Pool 1 (Navy Standard)	Baltimore	6.60				
Pool 9 (Super. Low Vol.)	New York	5.85	2.25	2.10	2.00@	2.50
Pool 9 (Super. Low Vol.)	Philadelphia	5.75	2.35	2.30	2.10@	2.50
Pool 9 (Super. Low Vol.)	Baltimore	6.10	2.00	2.00	1.75@	2.00
Pool 10 (H. Gr. Low Vol.)	New York	5.35	1.95	1.85	1.75@	2.00
Pool 10 (H. Gr. Low Vol.)	Philadelphia	5.25	1.85	1.85	1.70@	2.00
Pool 10 (H. Gr. Low Vol.)	Baltimore	5.60	1.90	1.90	1.75@	1.90
Pool 11 (Low Vol.)	New York	4.35	1.60	1.60	1.50@	1.75
Pool 11 (Low Vol.)	Philadelphia	4.35	1.65	1.65	1.55@	1.75
Pool 11 (Low Vol.)	Baltimore	5.00	1.75	1.75	1.65	
High-Volatile, Eastern						
Pool 54-64 (Gas and St.)	New York	4.00	1.60	1.60	1.50@	1.75
Pool 54-64 (Gas and St.)	Philadelphia	4.30	1.70	1.70	1.60@	1.80
Pool 54-64 (Gas and St.)	Baltimore	4.25	1.50	1.50	1.50	
Pittsburgh sc'd gas	Pittsburgh	5.25	2.40	2.50	2.35@	2.60
Pittsburgh gas mine run	Pittsburgh		2.25	2.25	2.25@	2.35
Pittsburgh mine run (St.)	Pittsburgh	3.60	2.00	2.00	1.90@	2.10
Pittsburgh slack (Gas)	Pittsburgh	3.25	1.65	1.65	1.60@	1.65
Kanawha lump	Columbus	6.25	2.60	2.60	2.50@	2.75
Kanawha mine run	Columbus	3.75	1.60	1.60	1.50@	1.75
Kanawha screenings	Columbus	3.35	1.05	1.10	1.00@	1.25
W. Va. lump	Cincinnati	6.50	2.55	2.60	2.25@	3.00
W. Va. Gas mine run	Cincinnati	3.85	1.45	1.55	1.40@	1.90
W. Va. Steam mine run	Cincinnati	3.60	1.45	1.55	1.40@	1.90
W. Va. screenings	Cincinnati	3.35	1.20	1.30	1.25@	1.40
Hooking lump	Columbus	5.25	2.60	2.60	2.50@	2.75
Hooking mine run	Columbus	3.10	1.75	1.80	1.65@	2.00
Hooking screenings	Columbus	2.85	1.30	1.30	1.25@	1.40
Pitta. No. 8 lump	Cleveland	5.10	2.45	2.45	2.00@	2.90
Pitta. No. 8 mine run	Cleveland	3.50	1.90	1.90	1.90@	2.00
Pitta. No. 8 screenings	Cleveland	3.30	1.50	1.55	1.50@	1.60
Midwest		Market Quoted	Jan. 8 1923	Dec. 24 1923	Dec. 31 1923	Jan. 7 1924†
Franklin, Ill. lump	Chicago	\$5.35	\$3.50	\$3.35	\$3.50@	\$3.75
Franklin, Ill. mine run	Chicago	4.10	2.35	2.35	2.25@	2.50
Franklin, Ill. screenings	Chicago	2.85	1.95	1.85	1.90@	2.25
Central, Ill. lump	Chicago	4.35	3.00	3.00	3.00@	3.25
Central, Ill. mine run	Chicago	3.50	2.10	2.10	2.00@	2.25
Central, Ill. screenings	Chicago	2.25	1.55	1.35	1.75	
Ind. 4th Vein lump	Chicago	5.10	3.25	3.10	3.00@	3.25
Ind. 4th Vein mine run	Chicago	3.85	2.60	2.60	2.50@	2.75
Ind. 4th Vein screenings	Chicago	2.50	1.70	1.65	1.75@	2.00
Ind. 5th Vein lump	Chicago	4.75	2.50	2.50	2.25@	2.75
Ind. 5th Vein mine run	Chicago	3.60	2.10	2.10	2.00@	2.25
Ind. 5th Vein screenings	Chicago	2.10	1.55	1.55	1.60@	1.80
Mt. Olive lump	St. Louis		3.10	3.10	3.00@	3.25
Mt. Olive mine run	St. Louis		2.50	2.50	2.50	
Mt. Olive screenings	St. Louis		1.75	1.85	1.75@	2.00
Standard lump	St. Louis	4.10	2.85	2.85	2.85@	3.00
Standard mine run	St. Louis	2.60	1.95	1.95	1.90@	2.00
Standard screenings	St. Louis	1.35	1.35	1.35	1.50@	1.65
West Ky. lump	Louisville	4.50	3.00	2.85	2.75@	3.00
West Ky. mine run	Louisville	2.75	1.60	1.65	1.40@	1.75
West Ky. screenings	Louisville	2.10	1.30	1.35	1.25@	1.60
West Ky. lump	Chicago	4.25	2.85	2.85	2.75@	3.00
West Ky. mine run	Chicago	2.75	1.75	1.75	1.50@	2.00
South and Southwest						
Big Seam lump	Birmingham	3.95	3.85	3.85	3.75@	4.00
Big Seam mine run	Birmingham	2.50	1.95	1.95	1.75@	2.15
Big Seam (washed)	Birmingham	2.60	2.35	2.35	2.25@	2.50
S. E. Ky. lump	Chicago	6.25	3.10	3.10	3.00@	3.25
S. E. Ky. mine run	Chicago	3.85	1.85	1.85	1.75@	2.00
S. E. Ky. lump	Louisville	6.60	3.00	3.00	2.75@	3.25
S. E. Ky. mine run	Louisville	3.75	1.60	1.75	1.50@	1.90
S. E. Ky. screenings	Louisville	3.35	1.20	1.35	1.50@	1.75
S. E. Ky. lump	Cincinnati	6.50	2.85	2.85	2.85@	3.00
S. E. Ky. mine run	Cincinnati	3.65	1.55	1.50	1.30@	1.75
S. E. Ky. screenings	Cincinnati	3.35	1.00	1.25	1.10@	1.50
Kansas lump	Kansas City	5.50	4.75	4.75	5.00	
Kansas mine run	Kansas City	3.75	3.25	3.00	3.25	
Kansas screenings	Kansas City	2.50	2.00	2.00	2.00	

* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Dec. 26, 1922		Dec. 31, 1923		Jan. 7, 1924†	
				Independent	Company	Independent	Company	Independent	Company
Broken	New York	\$2.34		\$9.00	\$7.75@ \$8.25				
Broken	Philadelphia	2.39			7.90@ 8.10				
Egg	New York	2.34		9.25@ 12.00	8.00@ 8.35	9.50@ 10.00	8.75@ 9.25	\$8.50@ \$10.00	8.75@ 9.25
Egg	Philadelphia	2.39		9.25@ 11.00	8.10@ 8.35	9.85@ 11.00	8.75@ 9.25	9.50@ 10.00	8.75@ 9.25
Egg	Chicago*	5.06		12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Stove	New York	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 11.00	8.75@ 9.25	9.85@ 10.50	8.75@ 9.25
Stove	Philadelphia	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 11.00	8.90@ 9.25	9.85@ 11.00	8.90@ 9.25
Stove	Chicago*	5.06		12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Chestnut	New York	2.34		9.25@ 12.00	8.00@ 8.35	9.85@ 11.00	8.75@ 9.25	9.85@ 10.50	8.75@ 9.25
Chestnut	Philadelphia	2.39		9.25@ 11.00	8.15@ 8.35	9.85@ 11.50	8.90@ 9.25	9.85@ 11.50	8.90@ 9.25
Chestnut	Chicago*	5.06		12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Range	New York	2.34			8.25		9.00		9.00
Pea	New York	2.22		7.00@ 11.00	6.15@ 6.30	5.75@ 6.25	6.15@ 6.65	5.50@ 6.50	6.15@ 6.65
Pea	Philadelphia	2.14		7.00@ 8.00	6.15@ 6.20	6.00@ 7.25	6.35@ 6.60	6.00@ 7.25	6.35@ 6.60
Pea	Chicago*	4.79		7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1	New York	2.22		4.00@ 5.00	4.00@ 4.10	2.00@ 3.00	3.50	1.75@ 2.60	3.50
Buckwheat No. 1	Philadelphia	2.14		5.00	4.00	2.00@ 3.50	3.50	2.00@ 3.50	3.50
Rice	New York	2.22		3.00@ 3.25	2.75@ 3.00	1.35@ 2.25	2.50	1.35@ 2.50	2.50
Rice	Philadelphia	2.14		2.50@ 2.75	2.75@ 3.00	1.50@ 2.50	2.50	1.50@ 2.50	2.50
Barley	New York	2.22		1.75@ 2.00	1.50@ 2.00	1.10@ 1.50	1.50	1.25@ 1.50	1.50
Barley	Philadelphia	2.14		1.00@ 1.75	2.00	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Birdseye	New York	2.22			2.10		1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics

Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1924	1923		
	Jan. 7	Dec. 31	Dec. 24	Jan. 8
Index	182	179	178	375
Weighted average price.	\$2.20	\$2.17	\$2.16	\$4.54

to the bottom of their stocks, but cold weather brought the domestic consumers into the market and started better tonnage movement to the retailer.

Some of the operators, in an effort to force movement of prepared coal, have been quoting jobbers nut and slack only where accompanied with orders for an equal amount of lump, egg or nut, or half the amount where it is block coal. The cold ended that practice. Screenings are scarce and high in price as compared with what they have been for some weeks past. Industrial demand is picking up noticeably and many Elkhorn and Hazard operations that had been down have reopened. Western Kentucky is producing again at a good clip after briefer idle time than was expected during holiday week. Screenings in that field are firm at \$1.25 and mine-run at \$1.40@1.90. Domestic sizes had not ascended at the end of the week.

Northwest Wide Awake Now

Blustery weather with temperatures running down to 25 deg. below zero at the Head-of-the-Lakes and varying below zero all through the Northwest has set the coal trade on edge. Talk of price cutting at Duluth has passed now and bituminous coal is moving inland from the docks at a tremendous rate. A reduction in smokeless at Duluth docks was the only price change recorded. The range now is: Lump, \$9.50; run of mine, \$6.50; screenings, \$5.50. This cut was made in order to gain more smokeless business from the regular anthracite trade. There is some talk once more of a shortage in the most desired sizes of anthracite.

Inquiry for coal for commercial building heating has been most healthy and the independent mining companies on the iron ranges are putting in orders. Many are starting their steam plants for the first time in three years. This is due to the lack of water power. Some of these mining companies will use from 10,000 to 20,000 tons this winter. The railroads are giving especially good dispatch from the docks and the docks are employing extra men to care for the loading rush.

Milwaukee dealers and shippers report a brisk business. The coke trade is correspondingly lively. Pocahontas lump, egg and nut were cut \$1.50 per ton on Jan. 1.

Western Trade Stronger

The winter wave sweeping over the West lived things up a good deal, especially in Colorado. There producers felt a marked improvement in demand for all sizes. The mines of the state were getting a little better than three days running time a week. In Utah general trade conditions improved also, though dealers were not keen to buy until they began to see the bottom of their stocks. Real winter was operating to empty the yards swiftly.

A week of winter around Kansas City with the thermometer registering near zero steadied the price of domestic grades in the Southwest. Mines are working four and five days a week, domestic "no-bills" have been cleaned up, and there no longer is any price shading. "No bills" of steam coal still are reported, but their number has diminished in the last week, in spite of increased production.

Ohio Trade Stimulated

The domestic trade at Columbus was stimulated temporarily last week by colder weather, with the result that retail dealers showed a disposition to come into the market. Some large users of steam grades are inclined to replenish their reserves, railroad demand appears to be better and some roads are taking bids for coal for stocking purposes. It is believed that the approaching end of the present wage contract, on April 1, is having some effect on the trade. During the week ended Dec. 22 the Southern Ohio Coal Exchange reports show an output of 148,232 tons out of a

total capacity of 686,065 tons from 446 mines reporting. "No market" was responsible for a loss of 488,228 tons. Colder weather raised the hopes of the trade at Cincinnati, but it did not affect prices. Screenings in the low-volatile and slack in the high-volatile coals were the features of the market. Mine-run is moving moderately. There is small demand for domestic coals and more than enough supply to go around. Pocahontas lump is now generally \$9. It has ranged as high as \$10.

Pittsburgh had its first real cold snap last week, but it not only failed to affect demand upon the mines but also failed to influence the sellers' position with regard to prices. Household supplies are lasting much longer than expected and it would take quite a spell of low temperatures to cause such consumption as would result in much demand for domestic coals. Now that inventory time is past, manufacturers may be slightly freer buyers, but so far there has been no definite evidence of this in the market. Dealers and consumers ridicule the idea of there being a real strike or contest, but admit there may be a voluntary agreement for a short time, to help liquidate consumers' stocks.

New England Shows No Improvement

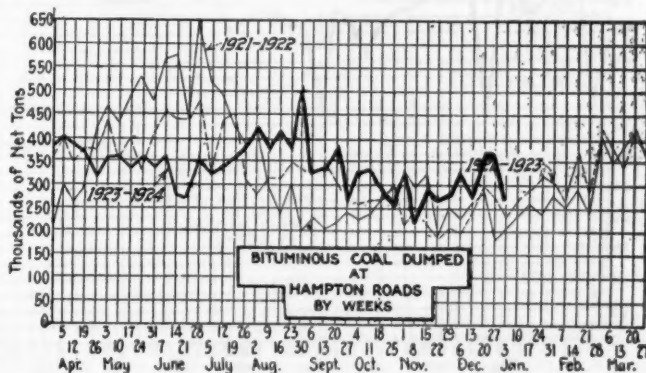
Notwithstanding colder weather and the slow movement of vessels there is no improvement in the steam coal situation in New England. Buyers show the same lack of interest that was characteristic of the latter part of 1923, and in spite of anxious search the trade is able to find no possible ground for an advance in prices beyond the generally low level that has obtained now for several weeks. The holiday suspension of mining has meant light receipts at all points, but even with minimum tonnages available there has been next to no inquiry for spot coal. Whatever hopefulness may exist for the near future in the industries is confined to certain specialties and is by no means evident to the coal man. Reserves are unusually large. All the storage wharves have a surplus, and in the absence of strike scare there is likely to be only mild request for steam coal during the next month or two.

The dullness at Hampton Roads drags along without interruption. The No. 1 Navy coals are still being quoted at \$4.60@4.75 per gross ton f.o.b. vessel. Sales of cargo lots in this market have become unusual. On cars at Boston there are nominal quotations of \$5.75@6 per gross ton.

The agencies for the higher grade Pennsylvania coals have about abandoned efforts to move tonnage to New England for the present, so large a portion of consuming area there having been restricted by high tariffs on the all-rail route to Pocahontas and New River rehandled at points like New Haven, Providence, Boston and Portland for shipment inland. Until the smokeless coals via Hampton Roads move up in price there will be little doing here for shippers of other coals. High volatiles in the Fairmont district are in the same plight, so far as New England is concerned, and prices are \$1.75 and less per net ton at the mine for mine-run, with almost no sale. It will take something drastic to invigorate the market here for any variety of bituminous.

Seaboard Markets Await Better Demand

The soft coal market along the Atlantic seaboard is waiting for a better demand. Indications point to better



business, but no one seems to be willing or ready to say when it will come. No one appears to be anxious with regard to conditions after April 1. Some consumers are asking about contracts but no big business is reported as closed. The Baltimore market reports an increasing line of inquiry and the supply of coal shipped is larger than the demand. Contracting is taking some attention and it is understood that some good grade of coal, ranging well up with Pool 9, has been contracted for at \$2 per net ton for the early months of the year, but this is below the average, as other contracts for Pool 9 coal are reported as having been placed at \$2.25@2.50.

Colder weather did not stimulate the West Virginia market, and in Alabama the trade is quiet and inquiries are few for either steam or domestic coals.

Foreign Market And Export News

British Coal Output Declines

Some anxiety is shown by British mine owners as to the outcome of the miners' ballot on the question of terminating the present wages agreement.

Production during the week ended Dec. 22 was 5,886,000 tons, a decrease of 70,000 tons when compared with the previous week, but an increase of 157,000 tons over the week ended Dec. 8.

After the recent unusual activity in the Welsh market conditions have become more settled. Most buyers have covered their requirements and efforts are chiefly directed to clearing tonnage so as to avoid delay. Most of the mines are well booked and are holding present prices for delivery during the next few weeks. In some cases concessions have been made so as to effect clearances. The refusal of the tippers to operate a third shift is proving of considerable hindrance to trade and the docks are crowded with steamers waiting their turn to load.

The Newcastle market is on the whole steady though there are irregularities here and there. Best steam coals are going well, present prices being maintained and the operators are asking an advance for January. In some cases stocks are being cleared at reduced prices.

French Coal Market Quiet

A decrease in the production and importation of coal was expected in France during the last few weeks of 1923, on account of the holiday season.

Supplies were, however, sufficient to meet both home and industrial demand and no shortage was feared.

The Nord and Pas-de-Calais collieries definitely decided to postpone until early in January putting into effect the increase of 5 fr. on flaming coals, and to reduce from 10 fr. to 5 fr. per ton the proposed increase on semi-bituminous coals. However, similar increases are already in effect in all other coal fields.

Export Clearances, Week Ended Jan. 5, 1924

FROM HAMPTON ROADS	
* For France:	Tons
Amer. SS. Ansable, for Nantes.....	4,717
Amer. Schr. Gladys M. Taylor, for St. Georges	1,384
Br. SS. Gloria De Larrinaga, for La Pallice	7,313
Swed. SS. Frost, for Castries.....	2,418
For Argentina:	
Nor. SS. Anna Sofie, for Guayabal	2,997
For Spain:	
Amer. Schr. Frank A. Morey, for Cartagena	809
For West Indies:	
Nor. SS. Munorway, for Fort de France	5,515
For Cuba:	
Br. SS. Berwindmoor, for Havana....	9,553
For Italy:	
Nor. SS. Asmund for Genoa	3,000
For Belgium:	
Ital. SS. Valreale, for Antwerp.....	7,442

FROM PHILADELPHIA

For Cuba:	
Amer. Schr. Eugenie Owen, for Sagua la Grande	

FROM BALTIMORE

For Italy:	
Dan. SS. Dorte Jensen	4,160

Independent Anthracite Quotations Decline

Lack of demand further affected the anthracite market, and in most sections quotations for independent coals showed a decline from last week. Retail dealers appear to be well stocked and ready to meet immediate needs, while some are soliciting orders. Lower temperatures did not bolster the trade to any extent, while the holiday season which resulted in lower production, was responsible for smaller shipments from the mines. Steam coals continue to be troublesome, with barley in best demand.

There was a sharp decline in the production of beehive coke the last week in December, it amounting to 221,000 net tons, as compared with 256,000 tons during the week ended Dec. 22.

Slight Improvement at Hampton Roads

Very little improvement in the coal situation was noticed at Hampton Roads last week, though prices stiffened slightly. The advance was attributed to lack of supply at the mines rather than to demand, many operations closed for the holidays having manifested reluctance in resuming work in view of low prices.

Coastwise trade and bunkers held their own, while foreign business showed a little life. The Virginian Ry. piers were still behind their schedule, due to the trainmen's strike and lack of coal. Inquiries of shippers were rare and no immediate business of large volume was forecast in the trade.

Shippers made less effort to book cargoes, because of prices that allowed little profit.

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Dec. 27	Jan. 3
Cars on hand	1,724	1,229
Tons on hand	110,586	77,320
Tons dumped for week	153,338	134,028
Tonnage waiting	9,325	15,000

Virginian Ry. piers, Sewalls Pt.:	Dec. 27	Jan. 3
Cars on hand	1,205	855
Tons on hand	78,800	56,800
Tons dumped for week	79,401	37,752
Tonnage waiting	8,115	1,455

C. & O. piers, Newport News:	Dec. 27	Jan. 3
Cars on hand	1,785	1,441
Tons on hand	94,735	75,500
Tons dumped for week	86,109	65,196
Tonnage waiting	6,610	635

Pier and Bunker Prices, Gross Tons

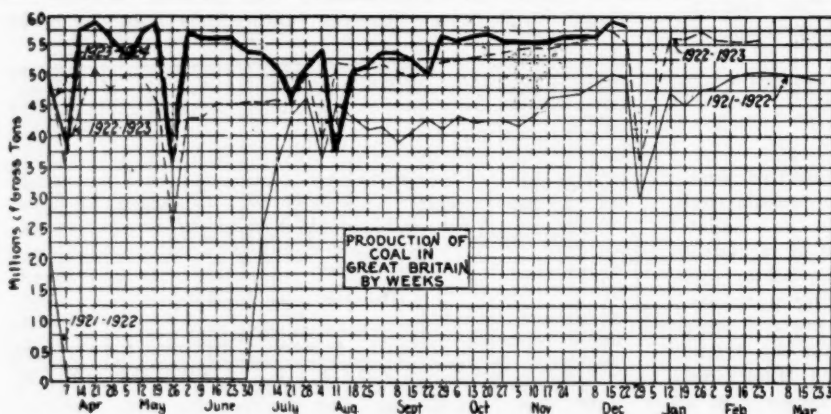
PIERS		Dec. 29	Jan. 5†
Pool 9, New York	\$5.00@	\$5.25	\$5.00@
Pool 10, New York	4.75@	5.00	4.75@
Pool 11, New York	4.50@	4.75	4.50@
Pool 9, Philadelphia	4.90@	5.20	4.90@
Pool 10, Philadelphia	4.50@	4.90	4.50@
Pool 11, Philadelphia	4.25@	4.60	4.25@
Pool 1, Hamp. Roads	4.50@	4.65	4.85
Pools 5-6-7 Hamp. Rds.	4.15@	4.25	4.25
Pool 2, Hamp. Roads	4.25@	4.30	4.50@

BUNKERS		Dec. 29	Jan. 5†
Pool 9, New York	5.30@	5.55	5.30@
Pool 10, New York	5.05@	5.30	5.05@
Pool 11, New York	4.80@	5.05	4.80@
Pool 9, Philadelphia	5.15@	5.55	5.15@
Pool 10, Philadelphia	4.90@	5.20	4.90@
Pool 11, Philadelphia	4.65@	4.90	4.65@
Pool 1, Hamp. Roads	4.50@	4.60	4.85
Pool 2, Hamp. Roads	4.25@	4.35	4.50@

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age		Dec. 29	Jan. 5†
Admiralty, large	29s. @ 30s.	29s. @ 30s.	
Steam smalls ..	20s. @ 23s.	21s. @ 22s.	
Newcastle:			
Best steams	24s. 3d. @ 25s. 6d.	24s. 3d. @ 25s. 6d.	
Best gas	24s. @ 25s.	24s. @ 25s.	
Best bunkers ..	25s. @ 26s.	25s. @ 26s.	

† Advances over previous week shown in heavy type, declines in *italics*.



Traffic News

Suspend Higher Hard-Coal Rates

The Interstate Commerce Commission has suspended from Jan. 1 to April 30 the operation of certain schedules which purposed to cancel rates on anthracite from Buffalo, Black Rock and Suspension Bridge, N. Y., to Minneapolis, St. Paul and other stations in Minnesota. The proposed schedules provided for a rate of \$6.25 per gross ton instead of \$4.38 between the points named and a rate of \$9.21 instead of \$7.34 from the Pennsylvania mines to Minneapolis and St. Paul.

New Coal Rates in Alabama

The Alabama Public Utility Commission has promulgated an order effective March 1, establishing a new schedule of rates on intrastate movement of coal and coke, which will affect a material saving to consumers of steam and domestic fuel. Only a comparatively small number of increases were shown in the general adjustment. The schedule has been under consideration by the commission for several months and public hearings have been granted both the railroads and the public.

Rate Finding Affirmed

The previous finding of the Interstate Commerce Commission in the matter of rates on coal from the Appalachian District to Spartanburg, S. C., and points beyond, on rehearing has been affirmed.

Suspend New Rates for Scrutiny

In the matter of proposed changes in the rates on coal from Illinois, Indiana, Wisconsin and St. Louis to Iowa, Minnesota, North Dakota and South Dakota, the Interstate Commerce Commission has ordered the new rates suspended until May 1 for investigation.

Monongahela Ry. Adds Tracks

As part of a plan to relieve congestion at its Maidsville yards, where a junction is effected with the Morgantown & Wheeling Ry., one of the principal feeders, the Monongahela Ry. has put in commission a four-mile stretch of track extending from the north end of the Maidsville yards to Lock 9, which is to be used for second running track service. The company also is putting in thirteen new tracks at Maidsville, each a mile long, in order to handle coal and other freight more expeditiously.

As a step toward handling loads and empties to and from the Morgantown & Wheeling Ry., operating on Scott's Run, acquired not long ago by the

Monongahela, that road is pushing construction work on the lower leg of a "Y". When the "Y" is completed loads can be accepted from the M. & W. without blocking traffic while empties are being shunted at the junction point.

"Soo" Coal Traffic Doubles

During the season of 1923 there passed through the Canals at Sault Ste. Marie, Michigan and Ontario, 16,709,305 net tons of soft coal and 1,686,006 net tons of anthracite, as compared with 8,790,571 tons of soft coal and 670,447 tons of hard coal in the season of 1922, according to the report of L. C. Sabin, general superintendent. Shipments during December were 113,600 tons of soft coal and 48,900 tons of hard coal, all of which passed through the United States Canal. Of the season's shipments, 16,547,771 tons of bituminous coal and 1,659,874 tons of hard coal were sent through the United States Canal.

Manley Moves Up

W. J. Manley has been appointed general traffic manager of the Pittsburgh & West Virginia and West Side Belt railroads effective Jan. 2. Mr. Manley has served as general traffic agent of those lines since last October. For three years prior to last October Mr. Manley served as traffic manager of the Logan Coal Operators' Association of West Virginia. Mr. Manley takes to his new position twenty years of practical railroad experience which covers all phases of railroading in the transportation as well as traffic fields, having been raised on the Great Northern, as well as operating a railroad in Peru for a considerable period. For three years Mr. Manley was associated with the Commission on Car Service of the Railway War Board and the Car Service Section of the Railroad Administration at Washington, D. C.

G. E. White Promoted

George E. White was promoted Jan. 1 to be general freight agent of the Chicago, Rock Island & Pacific Ry., headquarters Chicago, Ill., succeeding M. A. Patterson, deceased.

Trade Literature

The Smith & Serrell Co., of Newark, N. J., manufacturers of flexible couplings, have just issued a new bulletin, No. 37, which combines a new catalog describing many of the different types of flexible couplings which this company makes and gives some interesting information on the care and maintenance of couplings, together with engineering data covering the application of each type. A new high-speed coupling for use on high-speed

geared motor and turbine drives also is described, showing the details of construction, method of lubrication and application. Another new product of this company is the pressed steel type coupling for use on fractional horsepower motor drives. One section of the bulletin is devoted to the method of installing equipment with flexible couplings and describes in detail how the machines and couplings should be lined up before put in operation.

The Silent Hoist Co., of 302 McDougall St., Brooklyn, N. Y., manufacturer of hoisting machinery, has just issued Bulletin No. 22, describing the silent hoist electric car puller. This new bulletin describes the method of installing one of these hoists, its simplicity of design, method of drive and capacity.

Obituary

James C. Dennis, manager of the mine forging department of the Pittsburgh Knife & Forge Co., Pittsburgh, Pa., died Dec. 7, 1923.

James Gideon Steel, superintendent of the mines of the Eureka Coal Co. at Birmingham, Ala., died Dec. 23. Mr. Steel was 56 years of age and well known in the Birmingham district.

Martin Allen Patterson, general freight agent of the Chicago, Rock Island & Pacific Ry., with which he was associated for more than forty-two years, died Dec. 18, at Santa Barbara, Calif.

Coming Meetings

Engineers' Society of Western Pennsylvania. Annual meeting Jan. 15, 1924, Blue Room, William Penn Hotel, Pittsburgh, Pa. Secretary, K. F. Treschow, Pittsburgh, Pa.

American Wood Preservers' Association. Annual meeting Jan. 15-17, 1924, Hotel Muehlebach, Kansas City, Mo. Secretary, P. R. Hicks, Chicago, Ill.

Northeast Kentucky Coal Association. Annual meeting Jan. 24, 1924, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

Association Activities

The annual election of the Cincinnati Coal Exchange resulted in E. F. Bardin, of the MacBard Coal Co., being named president; Fred Gore, of the Blue Diamond Coal Sales Co., vice president; John Emslie, of the Creech Fuel Co., secretary, and R. C. Fitzgerald, of the Southern Coal & Coke Co., treasurer. The annual meeting will be held on the last Thursday in January and a nationally prominent speaker will address the members.

The Pennsylvania Coal Mining Institute, of Johnston, Pa., elected the following officers at its regular meeting on Dec. 28: President, W. A. Swift; vice presidents, B. F. Baldwin, Dennis L. Boyle and Thomas J. Davies; secretary, William Fleming, and treasurer, Vincent A. Stanton. Captain Edmund Steidle, of the Carnegie Institute of Technology, delivered an address on "The Occurrence and Detection of Mine Gases." At the meeting to be held Jan. 18 Prof. R. Z. Virgin will make an address.

The Northern West Virginia Coal Operators Association has launched a campaign for new members. In a recent statement John A. Clark, Jr., president of the association, called upon the membership to put forth every effort to have coal companies not members do their share in carrying on the work for the district as a whole. He directed attention to the money expended by the association in defending two cases before the Interstate Commerce Commission and said that the traffic situation is one of a number of critical matters which confront the coal industry of northern West Virginia and that offer opportunity for active co-operation and for constructive ideas and suggestions. It is asserted by President Clark that 50 per cent of the tonnage of the district is now carrying the burden, both financially and otherwise of helping all the operators. If members will endeavor to enroll others, it will lessen their burden, President Clark points out.

News Items From Field and Trade

ALABAMA

Negotiations are under way between Governor Brandon and owners of mines which are now working state and county convicts under the lease system to arrive at an agreement whereby the convicts will be worked under the complete jurisdiction of the convict department. A contract is being sought by which the coal would be mined and delivered at the mouth of the room or the haulageway at a stipulated rate per ton, the convicts to be worked, fed, clothed, guarded and maintained by the state. A large number of state and county convicts are employed in coal mines in the Birmingham district and there has been a strong sentiment worked up for abolition of the lease system in so far as it pertained to coal mining.

In a suit brought by J. L. King against the Kershaw Mining Co. for alleged damage to farming lands from overflow of water from its coal washeries in Walker County, a verdict was rendered in favor of the defendant, the first time a mining company has won a suit of this character in many years.

The Paramount Coal Co. has announced it will soon open two more mines near Helena, making three in all with a producing capacity of about 700 tons a day. The operations will be in a 250-acre tract leased from the Tennessee Coal, Iron & Railroad Co.

ARKANSAS

A new tippie is being erected at the Bernice semi-anthracite mine in Russellville, replacing the one burned in October. Origin of the fire was unknown. The old tippie was said to have been the largest in the Southwest.

COLORADO

A move to eliminate "fly-by-night" coal dealers, who are alleged to specialize on short-weight coal deliveries, by an increase in the annual license for the coal business from \$20 to \$250 was urged by representatives of the larger established Denver coal companies at a recent meeting before members of the City Council.

Production of coal in the state for the first eleven months of 1923 was 9,279,334 tons, according to the report of James Dalrymple, State Coal Mine Inspector. This compares with 8,847,833 tons for the corresponding period of 1922. The average number of men employed in and about the mines was 13,185 and the number of days worked per mine was 141.7.

DELAWARE

A charter has been issued to the Johnson Coal & Briquette Co., of Wilmington, with a capital of \$500,000.

ILLINOIS

A delegation of Carlinville citizens recently called on officials of the Standard Oil Co. of Indiana at Chicago in an effort to get the company to resume operations at its two mines near Carlinville, closed some time ago because of the high cost of production and the fact that coal could be purchased in the open market cheaper than it could be produced. Colonel Robert W. Stewart, chairman of the board of the Standard Oil Co., told the delegation that reopening will depend entirely on market conditions and the cost of producing the coal.

The Illinois Coal Corporation entertained a party of visitors at the company's new big mine at Nason, Saturday, December 29. Albert J. Nason, president; J. D. Zook, vice-president, and Cecil J. Smith, chief engineer of the company, were the hosts. Several of the guests started from Danville Friday morning in the new gasoline propelled railway coach, seating 68 passengers, and rode across the state in it to Mt. Vernon, where it was put in service on the coal company's new railroad, the Jefferson & Southwestern, which runs from Mt. Vernon to Nason and eventually may be continued beyond Nason to make other railroad connections.

Dr. F. C. Honnold, manager of the Honnold Coal Bureau, of Chicago, starts January 15 for a trip to Cuba and the Panama Canal Zone, returning by a United Fruit steamer to Havana with a three-day stop in Costa Rica. Dr. Honnold expects to pause at Key West and also to make a visit at the estate of a friend on the east coast of Florida a short distance above Palm Beach. Mrs. Honnold will accompany him. They will return to Chicago in about six weeks.

The Middle Fork Coal Co. mine of the U. S. Steel Co. at Benton, Ill., has suspended work indefinitely and 800 miners are thrown out of work. Mine drivers struck rather than accept 75c. per day cut in wages. Officials say they can buy coal cheaper than they can produce it.

A total of 850 men were thrown out of work temporarily by a fire which did \$100,000 damage to the tippie at Mine No. 5 of the Centralia Coal Co., Centralia. The origin of the fire is not known but it is believed to have been caused by crossed wires.

INDIANA

The annual report of Cairy Littlejohn, chief mine inspector, shows that during the state fiscal year 25,328,218 tons of coal was mined in Indiana, as follows: Machine-mined block coal, 18,206 tons; pick-mined block coal, 17,164 tons; pick-mined bituminous coal, 14,813,987 tons; pick-mined bituminous coal, 10,514,237 tons. Miners of the major mines of the state received total wages amounting to \$45,920,877.54 during the fiscal year. The total number of employees at the mines was 31,189. Seventy-five fatal accidents in mines averaged one for every 338,181 tons of coal mined. The total number of mining accidents was 6,528. The number of persons killed for each 1,000 employed was 2.40. The miners lost a total of 9,350 days' work because of no sales of fuel, and 7,814 from lack of coal cars. Strikes were responsible for the loss of 459 days of work in the state.

The proposal to consolidate the United Mine Workers' organization of district No. 8, the block coal field, with that of district No. 11, the Indiana bituminous field, was not taken up by the district No. 8 convention at Brazil recently, and officers stated that it was the intention to maintain a separate district organization as long as conditions would justify it. The convention disposed only of routine matters. The district officers were constituted a scale committee and will attend the United Mine Workers' scale conference at Indianapolis in January.

The No. 7 Ayrshire mine, employing more than 100 men, eight miles south of Petersburg, was flooded recently by heavy rains but may be able to resume operations in two weeks.

The Big Four railroad has made Petersburg, a freight terminal. Recently it established its coal terminal there and has built four miles of track just south of Ashby. Coal from the mines in Pike and Gibson counties is taken there where the trains are made up for the north.

The capital stock of the Pike County Coal Corporation, Petersburg, has been increased from \$250,000 to \$550,000.

MARYLAND

The sentences of twenty striking miners, convicted as participants in disorders at Frostburg, involving unlawful assembly, riot and assault, were commuted just before Christmas by Judge Doub at Cumberland, and 15 were released from jail in time to spend Christmas day with their families.

MASSACHUSETTS

In a report filed with the State Legislature the joint special Coal Investigating Committee says that legislation cannot assure a continuous and adequate supply of anthracite, and only by the adoption of

lower-cost fuels which are available can the public solve this problem. The report says that there is no justification for the present retail price of \$16 a ton charged for anthracite by most Boston dealers, and that the price should not exceed \$15.50. The committee recommends federal legislation providing for complete publicity of the accounts of the anthracite industry, including operators and their affiliated sales organizations, and transportation companies and miners' unions; that the President be authorized, in the case of actual or threatened interruption of production, to appoint a special commission of conciliation and inquiry; that the form of contract between operators and miners be revised and penalties provided in case of a breach of either party; that the Interstate Commerce Commission or some other federal agency be given authority, in the event of a fuel emergency, to prevent speculation by wholesalers and jobbers of coal, while in transit from the mines to the consumers, and that the State of Pennsylvania repeal "the now notorious anthracite tonnage tax." The committee urges that Congress authorize some federal agency to standardize the sizes and regulate the quality of anthracite shipped in interstate commerce. It favors the continuance in this state of the special commission on the necessities of life and the emergency fuel act for a period of three years.

NEW JERSEY

Legislation regulating the quality of coal sold in New Jersey is one of the recommendations in the annual report of J. Harry Foley, superintendent of the Department of Weights and Measures. Mr. Foley finds that the laws to protect purchasers as to quantity are adequate, but absence of regulations affecting quality is costly to consumers.

NEW YORK

E. E. Loomis, president of the Lehigh Valley R.R., has sent a letter to stockholders formally announcing a stock offering made possible through the segregation of railroad property and the Lehigh Valley Coal Co., as approved by the U. S. District Court. Under the new plan every stockholder in the railroad company will be granted the right to purchase stock in the coal company at a fixed price of \$1 per share. This privilege, however, will expire next April. Reference also is made to the hearing before the Interstate Commerce Commission on Jan. 17 of the application of the railroad to continue its lease and stock ownership of the Delaware, Susquehanna & Schuylkill R.R.

The Pennsylvania Coal & Coke Co. for November reports surplus earnings of \$11,364 after all charges and ordinary taxes, but before provisions for federal taxes. Surplus for the eleven months ended with November totaled \$738,922 against \$541,629 in the same period last year.

The Walter Engineering Corporation, of 299 Broadway, New York City, announces the affiliation as an associate of Frederick Schwertner, income tax counsel, to handle income tax matters for its clients. Mr. Schwertner is well known as an expert in such matters and has for several years made a specialty of coal-company tax cases.

Stockholders of the United States Distributing Corporation, at a special meeting held in Richmond, Va., approved the recapitalization plan, it has been announced. The plan authorizes an increase in the old 100,000 shares of common stock of \$50 par value and 10,000 shares of managers' stock of \$5 par value to 220,000 shares of no par common and 27,500 shares of 7 per cent \$100 par cumulative preferred stock. The new stock is to be issued to present holders of common on the basis of one share of new common and one-quarter share of preferred for each share of common now owned. The new preferred is to be convertible into common at the rate of four shares of common for one share of preferred at the option of the holder. The preferred stock is entitled to four votes, while the common has one vote.

OHIO

Reductions in the price of hard coal, soft coal and coke ranging from 25c. to \$1.50 a ton in Toledo have been announced by at least one dealer. Other dealers declared prices for soft coal are off from 50c. to \$1 a ton and that a reduction in coke prices is anticipated, but no reduction in hard-coal prices is in prospect, they say.

The Central West Coal Co., of Columbus, recently closed a deal whereby it acquired a tract of 1,000 acres of coal lands with two operating mines at Jasonville, Ind., on the C. M. & St. P. RR. The property has both No. 3 and No. 4 seams of coal and both seams are being operated. The capacity of the two mines is 1,500 tons daily. The purchase was made from the New Calora Coal Co., which name will be used for some time in conducting the business.

PENNSYLVANIA

The officers of the Philadelphia & Reading Coal & Iron Corporation, chartered in Delaware to take over the coal and iron interests of the Reading companies as approved by U. S. District Court Judge Davis, at Philadelphia, are: President, William J. Richards, Pottsville, Pa., who was president of the old Philadelphia & Reading Coal & Iron Co.; Robert J. Montgomery, vice-president; William H. McEwain, vice-president and secretary; David Wilson, treasurer; Martin P. McDermott, assistant secretary, and Charles A. Hurff, assistant treasurer. Directors of the corporation are Joseph B. McCall, Newton H. Fairbanks, William J. Richards, Robert J. Montgomery, William H. McEwain and George C. Coughlin.

The last of the bodies of the five men entombed Dec. 8 in the Mount Jessup mine, at Jessup, were recovered Dec. 31 by rescue workers. The men had been buried under rock. Two of the bodies, one of which was that of Eban Jones, the mine foreman, were recovered about a week after the accident, the third was removed on Dec. 29 and the two remaining bodies on the last day of last year.

H. M. James, formerly electrical engineer for the Hudson Coal Co., is now engaged in consulting, electrical engineering work, with offices in the Connell Building, Scranton.

The Lehigh Coal & Navigation Co. is electrifying its No. 9 colliery at Tamaqua, doing away with steam power.

Following the recent fire at the Beaver Valley Coal Co. breaker near Hazleton, the company's board of directors named the following officials to take charge of the plant after Jan. 1: George Reiff, Wilkes-Barre, general manager; George McCay, Wilkes-Barre, general superintendent; William Beltz, of Hazleton, paymaster and purchasing agent.

The Hazlebrook Coal Co., the Stonega Coke & Coal Co. and the Wentz Co. have bought all of the stock of the General Coal Co., a Delaware corporation, and as of Jan. 1, will operate it under their management. The General Coal Co., it was announced, will conduct the business formerly transacted by the Wentz Co. and will be the exclusive sales agent for "Admiralty," "Roda" and "Stonega" coal and coke produced by the Stonega Coke & Coal Co., and for the "Dependable" anthracite coal, produced by the Hazlebrook Coal Co.

The Board of Directors, of the Lehigh & Wilkes-Barre Coal Co. has abolished the title of president and general manager effective Jan. 1, and the title of that office will thereafter be president. On the same date, by order of President C. F. Huber, Douglas Bunting, formerly general superintendent, became vice-president and general manager, and Edward Griffith, formerly assistant to the general superintendent, became assistant general manager.

One thousand and seventeen fatal accidents occurred in the mines of Pennsylvania in 1923, according to the annual report of the Bureau of Workmen's Compensation of the State Department of Labor and Industry. In 1922 there were 809 deaths due to mine accidents.

Warren N. McCann, of New York City, has filed a suit in the U. S. District Court at Philadelphia to recover \$771,437 from William M. Richardson, president of the Philadelphia Export Co. McCann, who was a major in the Ordnance Department during the war, alleges in his suit, which is for trespass, that he agreed to sell Tabb & Burtleson, of England, 180,000 tons of coal; that he agreed to buy a large tonnage of coal from the Export company, which in turn was sold to the English firm. It is alleged the defendant addressed a letter to Tabb & Burtleson reiterating representations that McCann had bought coal inferior in quality to that which he had agreed to furnish and that Richardson further solicited business from the English firm, resulting in a cancellation of McCann's contract with Tabb & Burtleson and the Export company obtaining the business that the plaintiff had with the foreign firm. McCann claims

\$571,437 due to the loss of the contract and \$200,000 as damages.

The U. S. District Court at Philadelphia has approved the merger of the Reading Co. and the Philadelphia & Reading Railway Co. sanctioned by the Interstate Commerce Commission, together with the authority to issue bonds and the application of the company to operate its subsidiary railway companies. The company was directed by Judge Davis to file a report thirty days after completion of final steps in the dissolution.

Day and night shifts are working at Port Carbon, on the Schuylkill River, cleaning the river of thousands of tons of culm which have accumulated and caused the stream to overflow its banks. A New York briquet manufacturing firm is negotiating for the establishment of a washery at this point.

RHODE ISLAND

George H. Webb, State Fuel Administrator, and Frederick C. Freeman, vice-president of the Providence Gas Co., declared at a joint meeting of the Providence Engineering Society and the American Society of Mechanical Engineers at Providence recently that Rhode Island will take matters into its own hands and supply its own fuel unless Pennsylvania stops placing restrictions upon the coal industry. Captain Webb said there is more hard coal under the surface of the ground in Rhode Island and Massachusetts than there is in the State of Pennsylvania.

UTAH

There are fifty-four coal-prospecting permits in Utah and the state has a guaranteed revenue in the near future from coal leases on public lands amounting to \$63,225 a year as a minimum. The leases in the state average around 1,000 acres each and the guaranteed production in the four years covering the agreement with the authorities is 1,686,000 tons of coal from thirty-two leases.

VIRGINIA

The Norfolk & Western piers at Lamberts Point broke all its previous dumping records for a day on Dec. 31, when 61,000 tons of coal was dumped.

WEST VIRGINIA

The coal properties of W. E. Deegans in Logan County were sold on Dec. 31 to George M. Jones and Herbert Jones, according to an announcement made by J. Frank Grimet, secretary-treasurer of the various Deegans consolidated companies. The consideration is said to approximate \$1,000,000. The properties transferred are the Cub Fork Coal Co., the Paragon Collieries Co., the Orville Coal Co., the Faulkner Coal Co. and the Paragon Collieries Co. These companies operate seven mines with a total monthly capacity of 75,000 tons. The Logan coal holdings of the Deegans' interests constitute about half of the total holdings of the consolidated Deegans companies. The Deegans interests still have coal operations in the Norfolk & Western territory, in Greenbrier County and in Kentucky.

Although only six resident and one non-resident coal corporations were organized in West Virginia in November, the aggregate capitalization of the companies organized amounted to \$8,120,000. The Sullivan-Pocahontas Coal Co., of Tralee, a consolidation of seven different companies, controlled by J. C. Sullivan, alone is capitalized at \$7,500,000. Other companies organized in November were: the Turner Fuel Co., of Charleston, capitalized at \$25,000; Shamar Coal Co., of Eventon, \$5,000; Laurel Run Coal Co. of Fairmont, \$20,000; Macwarash Coal Co., of South Charleston, \$25,000; Wilbur Fuel Co., of Clarksburg, \$500,000; Mary Martha Coal Mining Co., of Cincinnati, Ohio, \$45,000.

The Putnam Company of Charleston has been organized to develop coal, oil and gas lands at various points in the state, the company having 1,000 shares of capital stock of no par value. Among those principally interested in the new concern are H. H. Carrie, F. L. Thomas, T. Brooke Price, Duke W. Hill and John D. Preston, all of Charleston.

Robert J. Lauder, assistant to the director of the safety department of the Consolidation Coal Co., has resigned his position to accept a position with the Roxana Petroleum Co., of St. Louis, Mo.

J. B. Clifton, of the Raleigh Smokeless Fuel Co., and T. H. Wickham, of Beckley, sailed from New York on Jan. 4 to visit South America in the interest of their company.

Organization of the Clean Eagle Coal Co., with a capital stock of \$200,000 presages operations in the Logan field on a large scale. Among the well-known capitalists interested in the new company are J. Cary Alderson, Naaman Jackson, State Banking Commissioner; Bruce McDonald, L. E. Steele, all of Logan; C. McDonald England, of Lexington, Ky. The office of the company is to be at Logan.

CANADA

Lovell G. Nickles, president of the F. P. Weaver Coal Co., of Montreal, announced on Dec. 5 that he has made application for a charter for the Canadian Welsh Anthracite Co., the purpose of which will be to introduce Welsh anthracite into the Canadian market. Associated with Mr. Nickles will be Sir Alfred Mond and other interests in the Amalgamated Collieries of Wales, and it is the intention of the new company to install a complete breaking plant in Montreal, so as to be able to lay down the Welsh anthracite in Canada in all the sizes required by the Canadian trade. It is understood that the F. P. Weaver Coal Co. will act as agents in Canada for the new company. The Welsh coal interests with whom Mr. Nickles is associated are prepared to ship 100,000 tons of Welsh anthracite to Canada in the first year and to increase shipments as demand warrants.

The Telkwa Collieries, Grand Trunk Pacific Ry., is marketing coal in Prince Rupert. A new seam has been opened.

The coal production of British Columbia for November totaled 200,515 tons, a decrease as compared to the production for the month of October of 27,777 tons. Vancouver Island produced 132,395 tons, which was 10,625 tons less than in October. The Nicola Princeton mines produced 20,842 tons, a decrease of 1,390 tons, and the Crow's Nest Pass district 47,278 tons, a decrease of 15,765 tons.

General Manager Avar, of the Maritime Coal, Railway & Power Co. at Amherst, N. S., has been notified by the Minudie coal miners that the contract offer of his company will not be accepted at present, as the legal adviser of the miners, Mr. Curry, of Glace Bay, is negotiating for the sale of the mine and, pending negotiations, the men do not desire to make any definite agreement.

Alberta Coal Supply Co., Ltd., has been granted an Ontario charter of incorporation to mine and deal in coal and other fuel, with \$40,000 capital. Joseph Montgomery, Harold O. Robinson and Austin Kopas are provisional directors.

Colliery operators, coal dealers, and others were much interested recently by the arrival in British Columbia of a shipment of approximately 400 tons of Welsh coal. It was carried in ballast by a vessel chartered for the Pacific Coast lumber trade. The coal found a ready market at prices a little under quotations on the local product.

G. Howard Ferguson, Premier of Ontario, addressing business men of the City of Edmonton recommended that the Alberta Government open a coal office in the City of Toronto to further promote the sale of Alberta coal products. It was his opinion that for a time at least the business of marketing western Canadian coal in Ontario would have to be handled by the governments of the two provinces.

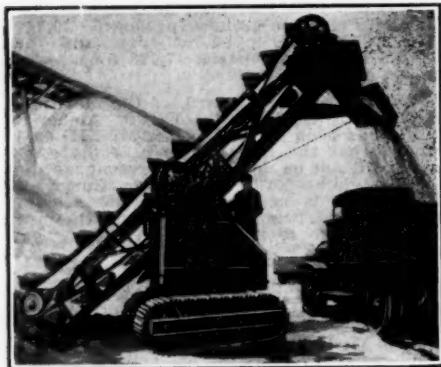
S. J. Cook chief of the Mining and Metallurgical branch of the Dominion Bureau of Statistics, states that the output of coal from Canadian mines during 1923, determined partly by estimate, amounted to 17,100,000 tons. Alberta had the largest production of any province, the total being 6,884,000 tons, and Nova Scotia was a close second, with 6,784,000 tons. British Columbia's mines contributed 2,825,000 tons, placing that province third among the coal-producing areas. Saskatchewan produced 368,000 tons and New Brunswick 292,000 tons. Approximately 10,000 men were employed in coal mines, three-quarters of them working underground, and one-quarter on the surface. The monthly production per man in October was 49 tons. During the first ten months of the calendar year the total importation of all coal was about 20,000,000 net tons, an increase of about 43 per cent over the preceding three-year average.

New Equipment

Crawler-Tread Loader

That it is capable of cutting a path 20 ft. in width through a pile of material by means of the swiveling feature is the claim made for the new crawler-tread power-swiveling industrial loader recently put on the market by the Link-Belt Co. of Philadelphia. This new industrial loader, shown in the accompanying illustration, is known as the "Grizzly." It is the large capacity, heavy duty loader of the Link-Belt group—a sort of parent to the "Cub" portable belt conveyor.

The new feature of the "Grizzly" loader is the crawler tread, the application of which to the industrial loader is of advantage because of the frequent necessity for moving such loaders over railroad tracks, rough and broken ground, piles of loose material and up inclines. The lower base is of solid, cast-steel construction, which eliminates the numerous rivet and bolt connections and makes for greater durability and rigidity. The lower



PORTABLE LOADER WITH CRAWLER TREAD

The tread of this loader is fitted with a cleaning device which makes clogging impossible under severe ground conditions.

base, which carries the loading mechanism, pivots on the tread in similar fashion to that employed by the larger and more expensive locomotive cranes.

Tread shoes of alloy heat-treated steel, cast in one piece, are attached by a patented design capable of self-cleaning. In the past, it is said, the one fault with mechanisms of this type was their liability to clog with dirt, sand, mud, etc. The Link-Belt self-cleaning tread adapted to the new "Grizzly" is said to make clogging impossible.

One of the principal features of this loader is its ability to swivel and swing independently of the wheel or tread base. It can back into a pile, dig, swivel and elevate at the same time, or it can do any of these operations independently—all at the will of the operator.

The steering mechanism of the crawler tread is controlled by a hand

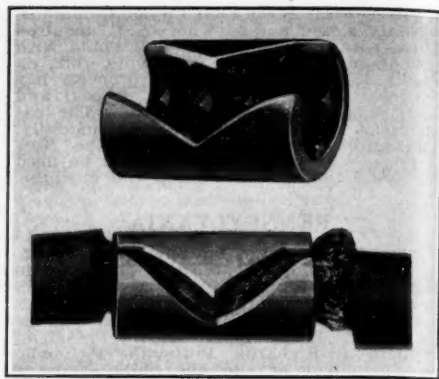
wheel, all other operations being controlled by levers conveniently located on the operator's platform on the upper swiveling frame.

The capacity of any loader will vary, of course, with the material handled. For the "Grizzly," however, a capacity of 45 cu.ft. per minute is claimed while handling bituminous coal. About the same rate of speed is given for sand and about 40 cu.ft. per minute with 1½ in. and under crushed stone. It is driven by a motor of ample power and of standard design.

Handy, Efficient Cable Splicer

Increased use of coal-cutters drills, cable-reel locomotives and many other portable tools has created a demand for a cable splicer which, aside from being efficient, will not too greatly increase the size of the wire at the splicer. There has long been a need for a splicer which could be applied without solder. Many times the cable breaks somewhere in the mine where solder is not quickly available; then again a soldered joint increases the diameter of the cable.

This small bronze casting clamps onto the ends of the cables to be spliced and firmly grips the strands when given a few blows with a hammer or similar handy tool. The teeth on the inner surface help to hold the cable tightly and form an efficient mechanical and electrical joint. On application, the splicer curls up and binds the cable ends firmly together. This device is a product of the Ohio Brass Co.



CABLE SPLICER

The upper illustration shows the teeth on the inside the splicer. These teeth grip and bind the cable ends as shown in the lower illustration.

Congo Car Mover

The Congo car mover is a device for moving cars at any location on the track. It is manufactured by the Congowango Car Co., of Warren, Pa., who assert that a loaded car may be moved a distance of eight inches with a single downward stroke of the handle. The three grips which hold onto the rail are arranged one on each side and one in the rear. These grips operate very efficiently while under load, and yet the operator can slide the device along the rail rapidly, thus moving a loaded car a considerable distance in a short time. A device of this kind is useful around coal tipples at the mines. Owing to the fact that it operates on the downward stroke it is quite possible for an ordinary strong boy to place a car wherever desired. All that is necessary is to set the device well under the wheel and throw the weight of the body on the long lever arm which is provided. All parts are made of steel, thus insuring long life.



MOVING A CAR BY HAND

It is claimed that this lever is arranged to make it possible to place a car with much ease and saving of time.